



SATURDAY, NOVEMBER 30, 1872.

Contributions.

Railroad Engineering in Peru.

[We are permitted by the favor of the recipient to publish the following interesting extracts from a letter written by an American engineer now engaged on one of the Peruvian railroads.—EDITOR RAILROAD GAZETTE.]

LIMA, Peru, October 9, 1872.

W. H. S., Esq.:

DEAR SIR— * * * We reached Callao, the seaport of this place, in sixteen days from New York. On arriving here I was appointed Division Engineer. My division was next to the Summit Division, and I was sent up the mountains to build my camp to suit myself. The place I selected for it, in the center of the division, was at an altitude of 13,000 feet. Whether it was the light air of the elevation of my camp or not, I am unable to say, but something did not agree with me there, and, after trying it for about six weeks, I concluded to get away. I was given the division of the finished portion of the road, about 46 miles, and the work on the stations of Lima and Callao. A number of large buildings at both places are being put up—round houses, machine shops, car sheds, etc.—and much to do in arranging tracks, etc. After being here for a month, I became quite well again, but I feel that the climate is very debilitating in its action, and new-comers need to be very careful in exposure or over-exertion. At first it requires more effort for an active American to hold back to the pace of the natives than to go at his usual rate. At the rate that Peruvian engineers work, an engineer in the United States could not earn rear-flagman's wages. I am not joking when I tell you that in the city here I have seen one of them have a boy in his party to carry his field-book for him, in ad-

and remedy of the disease, but it is as much a mystery as ever. He has been exceedingly liberal in providing hospitals and attendance for the sick.

The character of the country through which the road passes cannot be conceived of—much less described—without having been over it. The only description I have seen that gives one any idea of it is in Von Tschudi's "Travels in Peru," 1838 to 1842, A. S. Barnes & Co., New York. In his trip up the Rimac, he describes the country quite well. Very much of the line cannot be passed over by a biped until the road is made. He would need wings to do it. I have seen natural slopes of loose material, principally rock, about 1,000 feet high. To make an excavation in this, or to build an embankment upon it, is tremendous to think of. The summit tunnel, which is now under way, is about 15,300 feet above the sea. On the Arequipa Railway, which is now completed to a height of 10,000 or 12,000 feet, the experience is that it is easier making steam at that height than at sea level, although combustion is not so perfect. A curious item is, that at the summit tunnel the workmen cannot cook beans in an open vessel, the boiling point not being hot enough.

Enclosed I send you sketches of the line as now built at San Bartolome, Surco, and the Parac, so as to get the necessary height. They are not first-class "air lines," as you will see. The sketches are entirely from memory, and are only to illus-

ten days ago. Every week or two I notice a small one, but not severe enough to give one a good rocking.

Very truly yours,

J. M.

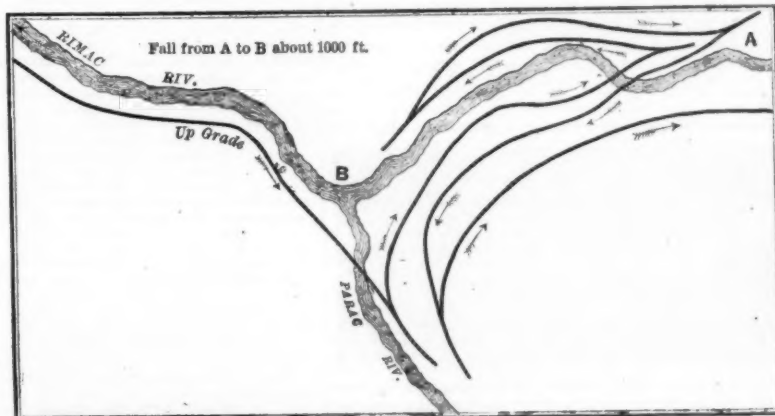
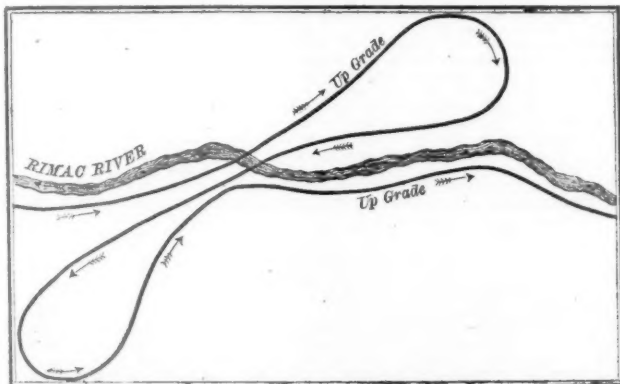
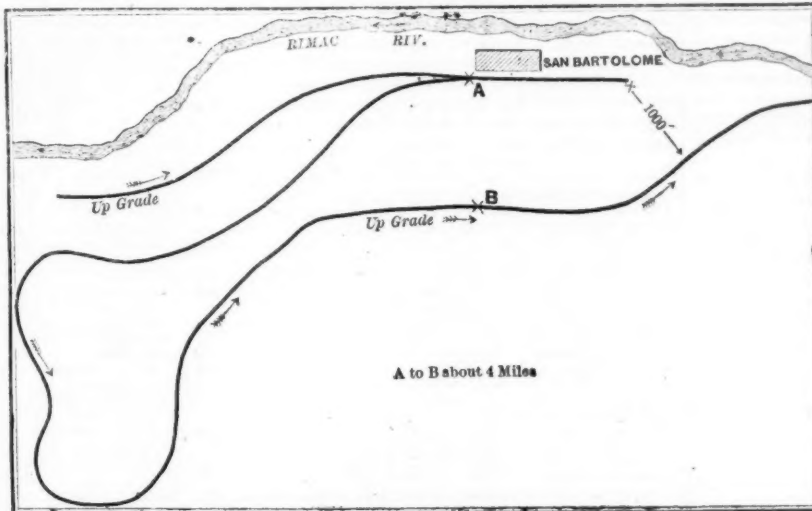
Inspection of Track for Premiums—Eastern Division Philadelphia & Erie Railroad.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In a former communication to the GAZETTE, I gave some account of the system of competitive prizes for good track which has been established on the Eastern Division of the Philadelphia & Erie Railroad. The final inspection for the current year and the award of the prizes for the best subdivision came off on Friday, November 15. There are, as I stated in my previous communication, seventeen of these subdivisions, usually five miles each, between Sunbury and Renovo, a distance of 92 miles. All the track foremen, supervisors and other parties interested, to the number of perhaps fifty, assembled at the Renovo House on the night previous, in order to be in readiness for an early start on the morning of the 15th. Two special trains had been provided by Superintendent Thomson, each consisting of a locomotive, a passenger coach and a gondola, on which was constructed a capacious shanty, provided with seats rising one above the other, and open at the rear, to afford an unobstructed view of the track. As the

upper portion of this road runs through a climate of nearly Arctic severity, each shanty was provided with a capacious stove. The first special carried the judges, Messrs. Thomson and Tyler, Superintendents respectively of the Eastern and Middle divisions of the Philadelphia & Erie, and Mr. Stahl, Supervisor of the Danville & Wilkesbarre Railroad. The invited guests and a portion of the track foremen occupied the remainder of the car, while the rest of the party were accommodated in the "second section." The expedition started about 8 o'clock a. m., running at a moderate rate of speed, so as to allow of the proper inspection of the work, passing over the entire division and reaching Sunbury at 4 p. m.

The most casual observer, if at all familiar with the former condition of the road, could scarcely have been otherwise than surprised at the improvement which a few months has brought about. The track from one end of the division to the other is in really excellent condition, particularly



dition to having one to carry his instrument. To attempt anything like a full description of what was new and interesting to me in railroading through the mountains would make a lengthy communication for a paper. I will give you some points though.

For the first 30 miles of the Callao, Lima & Oroya Railroad the grades do not exceed 2½ per cent. Then the 3 and 4 per cent. grades commence. Curves are limited to 120 metres (about 400 feet) radius, and grades to 4 per cent. (about 211 feet to a mile). On curves of minimum radius the grades are limited to 3 per cent. For a 4 ft. 8 in. gauge this makes sharp turning and heavy climbing.

The original surveys and studies of the road, on which the contract was taken, were made by a Peruvian engineer, a graduate of the Central School of Paris, and some portions of his project would hang a man before a jury of practical men. For instance, a projected bridge, 800 feet long, on a 3 per cent. grade and a 120 meter radius, that could be easily and cheaply avoided by putting in a "W" on the side of the mountain. Another portion of his projected line would have required a bridge on same grade and radius, 540 feet high!!

One bridge now being put up by the Baltimore Bridge Works at Agua de Verrugas is 262 feet high at central pier, all wrought iron. This is at the locality where the Oroya fever and the "Verrugas" have been most abundant. The last-named is a very peculiar disease, being a breaking out over the body of a kind of blood boil, very loathsome in appearance, but not dangerous unless the boils fail to come out. When they break internally, as they sometimes do, they are fatal. The five miles of that section which is now about finished is almost a grave-yard. Men have died there by the thousand. Mr. Meiggs has spared no efforts nor money to discover the cause

trate a fact, without any pretension to correctness of platting. Of course it is necessary in such a country to cross-section all ground that will probably be occupied by the line. Some of the maps, with contour lines at one and five metres differences or heights, are very extensive and elaborate, and location has to be carefully studied on them before trying it on the ground.

At first, a curious feature to me was the extensive use made of mules for transportation. Everything used on the line beyond the end of the track has to be packed on mules—lumber for camps, provisions, furniture, tools and machinery, coal, etc.; and much of the way lies through passes that are "ticklish" to a new comer. (There is no timber on the west side of the Andes, nor for 50 miles or more on the east side.) Packing on mules costs heavily. For instance, coal here (English) in port costs \$25 to \$40 per ton, and taking it over the summit to camps costs five cents per pound.

I made one trip to Oroya, the eastern terminus of the road, about 30 miles east of the summit. I did not get the "soroche" in crossing over, as many do—a kind of sickness caused by the high elevation resembling sea-sickness—but the view from the summit and the feeling that comes over one is something that cannot be described.

I became acquainted here some time since with Mr. Fairlie, brother of the builder of "Fairlie" engines. He is trying to introduce the engine here. Mr. Meiggs bought one, which is expected here soon for trial.

All the railroad buildings which are being put up here and at Callao are of iron. The buildings and rails come from England, ties from Oregon, and rolling stock from the United States. Gilbert, Bush & Co., of Troy, build the cars; Baldwin and Rogers the engines.

I have felt one good shock of earthquake; it occurred about

in regard to its line, surface and drainage. The greater part of the switches are brought up to the standard, and the policing of right of way, gathering up old material, etc., has been well attended to. Many of the station grounds were remarkably well cared for. The most noticeable defects, perhaps, were in the condition of the sidings and of the highway crossings, which in many cases formed serious obstructions to the proper drainage of the road-bed. The ditching and drainage as a whole, however, are fully equal to those of any road with which I am acquainted, and far better than is usually the case.

The award of the prize was a matter that required a good deal of sifting of evidence among the judges, and was by no means an easy matter to decide upon. There were not less than half a dozen among the contestants who had well earned a prize, and in fact every section showed the effects of judicious and conscientious work, and a disposition on the part of the foreman to make the best possible use of the facilities at his disposal.

The first prize of \$100 was awarded to John Considine, of Lock Haven. Mr. Considine's subdivision was remarkable for the perfection of its line and surface, which is the ultimate result intended to be reached in the improvement of a railroad track. The ditching and drainage were in thorough order, the switches in excellent condition, and the sidings much better than the average. The policing of the right of way and station grounds had also been well attended to. The subdivisions of Mark Phillips and John Johnson were so little inferior to that of Considine that the judges recommended that a second and third prize should be awarded to them, which will probably be done. The line and surface were also especially excellent on the subdivisions of Edward Phillips, Michael Nestor and —

Henry. On the subdivisions of Thomas Lacey, John Welsh and John Bratton the ditching and drainage were excellent and worthy of special mention. James Richards and Ed. Phillips had their sidings in very good condition. It is but just to the competitors to state, however, that it is impossible for a person like the writer, not thoroughly acquainted with the road and the circumstances under which the work was done, to decide how much credit is really due each one. It is frequently the case that the best and most painstaking work makes the least show to the casual observer. It was the unanimous opinion, both of the judges and of the invited guests, that all concerned had done themselves and the road a great deal of credit.

The location of the Philadelphia & Erie Railroad is in many places very injudicious and unfortunate. At least half of the Eastern Division is crowded between a steep mountain side and the river, not only making it very crooked, but very difficult and expensive to keep in repair. A great portion of this side-hill work might have been avoided by a better choice of route.

The expense of labor performed in repairing track, including ditching, etc., from the 1st of May up to the date of inspection averages about \$1,000 per mile for the entire division. An analysis shows that the expense of keeping the side-hill track in order is nearly double that of the portion located on approximately level ground.

The beneficial effects of such a competition as Mr. Thomson has introduced can scarcely be overestimated. I do not think it would be an exaggeration to say that the net profit, direct and "consequential," to the company resulting therefrom will fall but little short of \$50,000; and, unless I am much mistaken, the books will show it within two or three years. It is proposed to extend and elaborate the prize system during the coming season, so as not only to offer greater inducements to the men, but to enable each man whose work equals or exceeds a certain standard to gain one or more prizes.

This hastily written account would not be complete without some reference to the admirable manner in which the excursion itself was planned and carried out by Superintendent Thomson and his worthy assistant, Mr. Gucker. No pains were spared to have every one enjoy himself, and everything passed off in the pleasantest possible manner. Two or three years' work like that of the present season will bring the track of the Philadelphia & Erie Railroad into a condition that will challenge comparison with anything this country can produce.

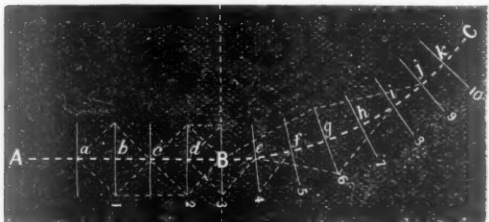
F. L. P.
NORTHUMBERLAND, Pa., November 19, 1872.

Staking out Trestle Bases.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Having noticed sundry methods in the RAILROAD GAZETTE of late in regard to the manner of locating the position of trestle bases, more in particular where the desideratum is a perpendicular to a curve, I would beg leave and venture to submit such practice as I have adopted, believing that the theory involved is not only one of the most simple that can be made use of, but that it is also one which can be executed with great rapidity; and on these accounts in practice I deem it superior to such as have heretofore been presented, while at the same time I never have been able to discover but that it is perfectly correct.

In the accompanying plan assume A to B to be a tangent.



B to C to be a curve. A to C to call for trestling. In the first place set up the transit at B and on the tangent alignment make points 12½ feet apart as far as trestling is called for, in a direction towards A . Then reverse your instrument and run in 12½ feet points on your curve as far as trestling is called for—the move being, as will be observed, to locate the center of each trestle base.

Now let one man hold the end of a tape at a point, say d , and a second man hold the end of a second tape at a point, say B ; a third man now runs out the first tape one-half the width of the trestle base, at d toward 2, which point 2 is located by a fourth man running out the second tape via B 2 and 2 c , when B 2 and 2 c are of an equal distance.

Precisely the same method applies for curves. On tangent I locate by the above method, where trestling is of an even height, only the odd-numbered trestle bases, the even-numbered ones being still more rapidly located as follows:

Hold one end of the tape at a point, say 1, and the other end of the same tape at a point, say 2. Now, at one-half the distance from 1 to 2, locate a point for the right end of the trestle at c .

To locate a trestle base at B (which is $P C$, or at a $P C C$ or $P R C$), if the trestle base be 25 feet or less, use a half distance, as from half of 1 to 2, in reaching from 2 toward 3,—point 3 being found by a tie-line of the half width of the trestle base at B , from B to 3.

To insure a proper degree of accuracy, I would have it borne in mind that it is advisable to have the diagonals flat enough to be one-third longer than the perpendicular distances used. In other words, to locate g — f , for instance, use diagonals 6 — i and 6 — e , or B — 6 and 6 — f , always bearing in mind that steep diagonals have not the accuracy of flatter ones.

B —3 may also be located by d —3 = c —2, and 3— e = 4— f , which ought in all cases to be tied by that half distance from B to 3, or other points on the line of the railroad's center line.

NIMROD.

The Protection of Travelers.

The following is a letter which was originally addressed to Hon. Charles Sumner by John M. Goodwin, C. E. (now of the Erie Railway), and published afterwards in the *Technologist* of October, 1870. In view of the recent serious steamer accidents, it will be read with interest at this time. The proposition to establish a "Society for the Protection of the Persons and Property of Travelers" is certainly a novel one. There are several reasons why the enforcing of regulations for the protection of travelers is not attended to if left to individuals or to the railroad and steamboat companies. To say nothing of the selfish motives which might induce the latter to take no trouble and incur no expense which does not bring direct returns unless they are compelled to, there is the further and very serious one that they are not likely to be informed of many of the faults and neglects of their officers and employees. This is very likely to be the case with minor matters which are productive only of slight discomfort to the traveler, and of neglect which does not happen to result in accident. Frequently no better or more grateful service could be done a company than to make complaint. We believe that most corporations desire to attend carefully to the comfort of travelers, as all certainly are anxious to avoid accidents. Were travelers to organize themselves into a voluntary corps of inspectors of such matters as come within their observation, and report palpable faults to the general officers of railroads or steamers, the latter might hear of and be enabled to abate many nuisances or even criminal negligence, of which otherwise they would be ignorant. And as to those matters wherein the recognized rules and established laws for safety are deliberately violated by the corporations themselves, any organization which will bring culprits to punishment and cause them henceforth to obey the laws will deserve the support of the community.

LETTER TO CHARLES SUMNER.

SIR—The object I have in view is the prevention of those disasters commonly, but not properly, called "accidents," by which travelers by steam and rail in this country so frequently suffer; and, as a step toward this desired end, I submit for your consideration some facts, and take the liberty of making some suggestions, which may, I hope, prove of use.

The frightful calamities which constantly take place, on our Western rivers particularly, come in the shape of burnings, explosions, collisions and sinkings, of steamers. I have no extended statistics at hand which would exactly indicate the kind of disaster most frequent. Probably more steamers are destroyed by burning than in any other way. Explosions are usually followed by fire, and explosions and fire generally follow serious collisions, unless immediate sinking is the result of the collision. The fate of a steamer on Western rivers is to be burned, blown up, or sunk; a few escape.

The list of the steamers destroyed within the three years past may be readily made up. The list of the lives lost with the steamers can never be made. We know, however, of the hundreds who perished through tortures, a thoughtful analysis of which produces a sickness of the heart almost mortal. We know, too, that these horrible slaughters and burnings and drownings came to pass, in almost every instance, in consequence of neglect, on the part of some one or more persons, of duties specifically enjoined by law, as well as by the dictates of prudence.

As you, sir, probably know, from observation, the steamers navigating our Western rivers are built with an especial view to giving them the least possible draught. The hull and every part of the boat is constructed of the lightest kinds of wood, and with the use of the least possible quantity of material. Every part of the upper works of such a boat, exposed to the action of the sun and wind, the heat of the boiler fires, and cabin stoves and lamps, becomes as readily inflammable as match-wood, and when fire seizes such a structure it spreads with a rapidity which only those who have seen such conflagrations can realize.

Upon these floating tinder-boxes the material (in every instance that has come under my observation) used in lamps is kerosene oil. In a large boat from twenty-four to thirty large lamps, each containing more than a pint of oil, hang from the roof of the cabin, while supported by brackets at various points are several more of the same kind of lamps. There are usually in the "office" two standing lamps, and in the rooms on the "guards" several bracket lamps. Along the middle of the cabin there are generally three large upright coal stoves, which are often kept at a red heat, the common sheet-iron pipes passing out through the cabin roof. Though tied to the floor by rods of iron or by wires, these stoves are liable to be overturned by collision or otherwise, and are always sources of danger. The lamps and lanterns on the lower deck are in most cases fed with kerosene oil, and in making night landings the sparks and flame from huge basket torchlights fly wherever they may be carried by the wind. Hay, hemp and cotton, and other easily ignited articles are common freight on our boats. The law says that such freights shall be covered with canvas or tarpaulins, or similarly protected from fire. Careful and law-abiding steamboatmen who do so cover such articles are not entirely wanting, but though I have seen many lots of baled hay on steamers, I do not remember that I ever saw any canvas or tarpaulin over the hay.

Gunpowder, acids of various kinds, and explosive compounds and manufactures, are carried on our boats under licenses which specify that such articles shall be secured in "magazines" not less than twenty feet "from any fire on board." These magazines are wooden boxes or compartments lined or covered with sheet-iron, zinc, or tin. The powder, etc., passes to and from these magazines "under fire." I have seen hundreds of kegs of powder unloaded from steamers which had many passengers on board, amid a crowd of men, some of whom carried lanterns, and some had cigars or pipes lighted, while over all blazed and sputtered the torchlight in the open air.

Kerosene oil is carried on the lower deck of steamers without special actual restriction, except that the law says that it shall be placed on the guards. I have seen it piled up two tiers high upon the forward deck of the boat, except in the gangway, where it was only one cask high. It does not appear, however, that it is any more dangerous to carry this oil upon the forward deck than upon the guards. This particular boat was loaded so that her guards were in the water, and most of her freight, judging from appearances, was kerosene oil; her cabin was filled with passengers.

Varnish, benzine and similar articles are carried in jugs or cans, packed in kegs or barrels. These kegs or barrels are generally open at the top, and contain straw or hay as packing. They frequently stand about on the upper forward deck. The uncovering of hand-lamps, and even the filling of them while burning, is not always prevented, although no doubt such recklessness is forbidden on every boat.

I do not propose, Sir, to go into a dissertation upon the subject of boiler explosions. It is a very well established fact that such explosions take place, and that when they take place on steamboats a great loss of life is usually the result. Steam boilers, of the forms in general use on steamboats, and in locomotives, made of the best material and in the most careful and

workmanlike manner, and operated with exact attention to all the conditions and precautions universally held to be necessary to the regulation of the pressure of steam in them, and to the prevention of any dangerous, sudden generation of such pressure, have exploded in consequence of instantaneous developments of force, the causes and manner of which are not understood, and against which, in such boilers, we have as yet no safeguard. It is necessary to admit this, I think. There is, however, no ground for questioning the truth of the assertion that nearly every boiler explosion, ashore or afloat, is the result of recklessness or insufficiency in some quarter. By the use of the term "recklessness" I mean to include "carelessness" of all common kinds, but I do not intend it to describe carelessness simply, but to indicate that worse than thoughtless disregard of obligations and responsibilities which is criminal. It is difficult to find a word which shall express the quality of the act of a man who knowingly, and with the intention of gaining money, uses a plate of inferior iron in the making of a boiler and stamps it as iron of a superior grade; or who runs a steamer for passengers after he knows that her boilers are untrustworthy; or who, being appointed expressly for the purpose of securing a careful examination into the condition of passenger steamers, certifies that such a boat is "staunch and safe in every respect" when he knows that she is not so.

It is difficult, also, to define the condition of public sentiment which allows such things to be done, and makes no determined effort to secure: first, the enactment of laws which shall be more precise and thorough than those now on the statute books, and then the exact enforcement of those laws. With a view to providing for the occupation by the public of the position which (as it seems to me) it ought to assume in this regard, I submit, further on, some suggestions.

I am fully aware that in such a matter as this, particularly, assertions should be supported by definite proof of the foundation in fact, but as no statements in the nature of *ex parte* evidence would avail here, I do not cite particular cases. Any one who has examined into the matter is forced to the conclusion that the laws intended to govern steam navigation, on our Western rivers particularly, as now framed, do not cover all the ground that they should cover, and that in some instances they specifically permit things which should not be permitted; and that said laws are not always thoroughly and to the letter enforced, or fully and according to their spirit observed; and further, that in the matter of inspection of boilers, outfits and hulls, more frequent and perfect examinations should be required. More serious penalties should be imposed for non-compliance with the law, and for neglect of duty in government officers or others.

The forms of certificates of inspection should be revised and amended and a special form required for each class of boats, and interlineations and erasures in such certificates should be prohibited.

I have seen a certificate of inspection on board a passenger steamer in which the Inspector certified that the boat had not some things without which she was by law not entitled to a certificate. These lacking things were, as the interlineations informed me, "to be supplied."

As to collisions: The existing code of signals by lights and whistles, if carefully used, and the accompanying regulations strictly observed, answers quite well the purposes for which it was devised. I think, however, that the evidence of pilots on the Mississippi and its tributaries would go to show that more certainly would be secured, and thus much anxiety and risk avoided, and consequently some accidents escaped, if the lights indicating the starboard and port sides, respectively, of a steamer were arranged as they are on sea-going steamers, so that neither light can be seen athwartship or astern. These lights are now hung from the chimneys in such a way as to show themselves in almost every direction, the rays frequently crossing each other. Stern-lights could be arranged to indicate the position of the boat to another approaching from astern.

The term "light" is too indefinite, because it allows the use of lights of all degrees of intensity, from a brilliant blaze in a clean lantern to the flicker coming from a single wick in an ordinary white lantern covered with red flannel to simulate a proper "red light," and uniformity of power in night signal-lamps is of the greatest importance, inasmuch as it is principally upon the volume of light seen that we base our estimate of the distance between us and the light. If one could always be sure that a light of a certain color, green, red or white, seen in a certain position, was of a certain intensity, one could soon learn from experience to judge with accuracy of distances in the night by the aid of such light. If this statement is correct, then a uniformity in style, size and power of signal-lamps used at night on steamers would be beneficial.

To recapitulate: The suggestions I make are, that no steamer carrying passengers be permitted to carry petroleum, crude or refined coal oil, kerosene, benzine, naphtha, gunpowder or blasting powder, cotton, straw, hemp, hay, varnish, or any explosive or highly combustible material or compound as freight, or for use on board the boat—cotton waste, hemp and lubricating oil to be excepted in such quantities, at one time, as may be necessary for cleaning, packing, and oiling machinery for one round trip.

That the use of coal oil, petroleum, kerosene, camphene, or similar articles or mixtures, in lamps or otherwise, be prohibited upon steamers carrying passengers, (and it would be better to prohibit the use of these articles upon steamers entirely, for one boat on fire may communicate the flame to another).

That the system of inspection of boilers, hulls and outfit of steamers be materially modified, the duties of inspectors and steamboat officers more exactly defined and more strictly imposed, and the penalties for neglect or wrong doing made more severe; and that the matter of a modification of the rules in relation to steamboat signals be made a subject of investigation.

It appears to me that true economy indicates the building of our river steamers of iron throughout; but no such radical change in construction is advocated in this connection.

The outcry of the public in denunciation of mismanagement in any one of its very many forms is loud enough, immediately after some disaster through which hundreds of lives are lost (on the Stonewall, October 28, 1869, two hundred and sixty-nine lives were lost), but it is not long enough, nor does any person, or combination of persons, take measures to make the penalties which ought to follow "mismanagement" felt by those who should be made to feel them. The various levers which the law proffers for the use of any who wish and can afford to operate them are left idle so far as any working of them for the general good and protection or remedy is concerned. Suits against common carriers brought by individuals for their particular remedy are frequent; but the suits which should have been brought to enforce the proper penalties for the neglect which finally caused disaster were not instituted. Such suits are very seldom brought. No private individual will, nor can, take the place of prosecutor for the public. The inconsistency of public sentiment is such that, whatever his motives might be, the person who should persistently demand of the law the same things which are, at frequently returning times of general excitement, clamorously called for by the press and the entire community, would be suspected by the public to be no better than a mercenary meddler. As to the entertainment such a person would receive from the "servants of the public" liable to be brought to account by him, there is little room for question. His efforts would certainly be productive of but little benefit to the public. A properly organized association of individuals, however, could accomplish a good work in the indi-

ced direction. I therefore suggest the incorporation, by act of Congress, of the "American Society for the Protection of the Persons and Property of Travelers," which society should be of the District of Columbia, and have its headquarters in Washington.

The incorporators named in the act, or at least five of them, should be required to meet within one year from the approval of the act, and frame and adopt by-laws subject to revision at subsequent meetings, issue statements of the objects of the society, and take such steps to secure a permanent and working organization as may seem best to them.

The society should be authorized to acquire real estate for office purposes, to receive real estate as devises, or from donors, and to manage or dispose of the same for the benefit of the society in its legitimate operations; to receive and expend, in furtherance of the object of the society, money which may be paid to it for memberships or as unincumbered donations; to have by its accredited agents all the rights of a natural person in all courts of the United States, and of the territories of the United States; and, when invested therewith by authority of any State of the United States, all the like rights in any court in such State.

The society should have authority to appoint and maintain as many agents as it may deem necessary, to be stationed at such points as it may select, or to travel upon such routes as it may designate.

The society should be required to print and publish in the month of January of each year a statement, certified by its President and Treasurer, exactly specifying the condition of the society at the close of the year ending December 31, preceding the month of publication, and reporting in detail all the transactions of the society during the year ending on December 31, as aforesaid. Such reports would be of much value to the public. Congress should reserve the right to amend or restrict or repeal the act chartering the society. I am sure that much good might be effected by such an organization.

[We have received from Mr. Goodwin, the author of the above, the following exposition of the manner in which the proposed Society might work.—EDITOR RAILROAD GAZETTE.]

The act incorporating the Society, the name of which has been above suggested, should make it the duty of any United States District Court in which a duly authorized agent of said Society enters a complaint against any steamship, steamboat or railway company, or any person or persons engaged in the transportation of passengers and their effects, for neglect or violation of any United States law made for the government of such companies and persons, to take summary action in the premises, in order that prompt punishment may be dealt to the guilty, and that delay and damage to persons and property in transit may not ensue in consequence of the interference of the law.

State Legislatures should make such enactments as will secure like summary proceedings in case of action taken in State courts in behalf of the public by agents of the Society, under existing State laws for the regulation of the transportation of passengers.

The establishment of such precedence for such cases will be recognized by the public as a necessary provision for the general good.

Having completed its organization and prepared its instructions and rules for the information and government of its employees, the Society would duly accredit and commission as agents persons of character and ability who, from practical experience in, and successful administration of, the business of departments similar to those over which they would be required to exercise supervision, would be especially fitted for such positions, and it would, through these agents, maintain a surveillance of the various railways and lines of travel throughout the United States, and upon the rivers and waters under the jurisdiction of the United States. Armed with proper authority, these agents or inspectors would find no difficulties in discharging their duty where, as before intimated, private citizens would be powerless.

Both United States and State laws affecting the matters under consideration might be bettered by modification in some particulars; but if we secure strict conformity to the requirements of these laws as they now exist, we shall secure a measure of safety much larger than we now have.

A review, extending over the past few years, presents a most remarkable series of calamities: The Kever accident, the Angola accident, the Hamburg accident, the Westfield accident, the Metis accident, the Bienville, the Dean Richmond, the Missouri accidents—all accidents.

The Kever accident was thus accounted for and discussed: "Probably a long period of successful management without any serious accident had rendered every official easy."

"If there had been a siding at the Saugus Branch Junction, this accident would not have happened." * * * "Now that the accident has happened, the omission to have a siding there seems a piece of excessive carelessness." * * * "All the employees of the railroad both at Lynn and Boston say they think the telegraphic operators at both places had either gone for the day, or gone to tea." * * * "To the horrors of this accident" the members of the committee of investigation were, as they said—and no one doubts that they said truly—"keenly alive"; and they had cause. To the credit of the road on which this accident took place, be it said, that if expensive appliances in the shape of signals, and an anxious desire to avoid repetitions of the disaster will avail, no more such catastrophes will occur on that line; but the officials of the line must not allow themselves to become "easy" in the sense indicated by the sentence quoted a few lines back, nor must necessary communication between important points be interrupted that the telegraph operators may "go to tea," or to bed.

The Angola accident was caused by a want of uniformity in the gauge of the road on which it took place.

The Hamburg accident may be reproduced any day as long as opposing trains on double-track roads are run in a manner that indicates the assumption on the part of the officers of the roads that the narrow space separating the two tracks is an impenetrable barrier protecting each train from any incursion upon its "right to the road" by another train moving in an opposite direction.

Let us hope we may not have to record the most fearful accident in the history of railroads, which will happen when one of two express passenger trains, running at full speed and meeting on double track, leaves the rail and tears the opposing train into atoms while it is itself totally wrecked.

To prevent Westfield accidents and Dean Richmond accidents, let us have proper and frequent and interested inspection of boilers and engines; and let us have, always, capable men to handle the boilers and engines.

Is it absolutely necessary that the Bristol run, in a dense fog, at the rate of ten miles per hour in a channel-way where vessels in greater or less numbers are always to be met, and where they frequently anchor?

Is it necessary that, if the "Metis" knocks a hole in her bow, her fires are drowned in a few minutes and that she sinks soon after?

Are there no means of preventing the shipping of friction-matches and Greek fire boxed in the guise of innocent combustibles, and the pitching of three or five-gallon demijohns of aguardiente into lockers, to roll about, like shot adrift between decks, till they break and let their alcoholic contents run down through leaky decks upon hot boilers?

The writer of this article assumes that means for the prevention of these fatal acts of commission and omission are within our reach; what we want is the corps of guardians whose business it shall be to "interfere" wherever the safety of the public demands interference, and the public must support them.

One of the officials of the New York & New Haven Railroad said to Mr. J. A. Coleman, who was striving to protect the public from maltreatment and brutal violence by forcing said railroad to, in a measure, compensate him for having beaten him on the head and thrown him from their car (see *Atlantic Monthly* for December), "the road has no personal animosity against you, Mr. Coleman; but you represent the public, and the road is determined to make it so terrible for the public to fight it, that it will stop it; we are not going to be attacked in this way." But Mr. Coleman, constituting himself a "Unit" for the Protection of a Passenger, persisted through most wearisome litigation, and finally got partial justice in the shape of an award of \$3,500 damages.

The individual members of the public should not be left to fight single-handed their battles with "terrible" antagonists like the New York & New Haven Railroad Company.

Let us have an organized force to compel the common carriers to observe their obligations. Let us have the laws enforced, and since, as Mr. Coleman and many another can testify, the contention with great companies—and with little ones, also, for that matter—is exhausting and exasperating and often futile when carried on single-handed, let us make common cause in the premises. The result will be beneficial to ourselves and also to those whom we compel to preserve their property from demolition, from wreck and from confiscation.

Contributions to the Society for the Protection of Passengers might be properly charged to insurance account. The care that will protect life and limb will at the same time protect property, and shippers and insurance companies should aid the passengers in establishing the Society.

Communications on the subject above considered are respectfully solicited from the public by the writer at Room 7, No. 72 Broadway, New York.

A draft of a bill to authorize the organization of the Society, to be presented to Congress at its coming session, will be submitted for the consideration of any one who may feel sufficiently interested in the matter to apply for a copy of the same.

J. M. GOODWIN.

If an agent of the Society for the Protection of Passengers could have been on the train that was smashed near Philadelphia two nights ago, we should have been able to command a clear and reliable report of the facts in the case, unless, indeed, the said agent had been killed with the other victims.

J. M. G.

The Boston Fire and the Railroads.

Boston, Tuesday, November 26, 1872.

Now that the smoke rises in thinner clouds, and the brick, mortar and rubbish begin to disappear from the scene of the great fire of sixteen days ago, a clearer opportunity is afforded to ascertain how the different monetary interests are affected by the complete destruction of eighty millions of property. The depreciation of insurance stock touched bottom much sooner than after the great fire at Chicago one year ago, principally because the failure of the insolvent companies was much less disastrous, and the stockholders were not comparatively such heavy losers. The railroads must, it seems to me, suffer less by the fire, and, indeed, must feel its effects much less than any interest of anything like so much importance to the community at large.

First, as to the immediate losses, the only railroad touched by the fire is the Boston, Hartford & Erie, whose station (which the company rented) was burned, involving a loss to the company of about \$5,000. All the books and papers were saved, a passenger car turned into a ticket office, and already a corrugated iron temporary depot is in process of erection. In this connection it is worthy of note that \$3,000 in Bonded mortgage bonds were burned in a single trunk, whose owner does not know their numbers, and, consequently, suffers a total loss. The Hartford & Erie pays a monthly rent at the rate of \$40,000 per annum, and is only a tenant at will. The trustees have wisely determined to delay any extensive building operations until the future of the road is more definitely determined. By the way, this road promises to be the first to carry passengers through the city of Boston without transfer. When the through line to New York is in operation, trains will be taken across the city through Broad and Commercial streets by means of the Union Freight Railway to the Eastern and Boston & Maine roads, and

cars be run without change from New York to St. John, and ultimately to Halifax.

In respect to the traffic receipts, the effect on the monthly receipts will be almost imperceptible; the horse disease exerted a much stronger influence than the fire. Of course the destruction of the jobbing and commission dry-goods houses prevented the shipment of goods to Boston for a week, perhaps, but during that time a large part was sent to branch warehouses, and when the new locations were obtained—and some opened in new quarters on the Monday morning after the fire—they began receiving goods as before. The leather houses were almost all burned out, and yet the receipts of leather and hides are now as heavy as ever before, and the shipments of shoes have only fallen off one-third. Goods for export also arrive freely and with no apparent diminution in the amount. One other point is worthy of notice—that the trade was fully three weeks later than last year; and now, having received so severe a check, the most strenuous efforts will be put forward to see that trade is not driven from its present channels. Mills are running at their utmost capacity, and the receipts of manufactured goods will be very heavy during the month to come.

It is doubtful if this increase is sufficient to affect the price of railroad stocks, and yet they hold their own much better than bank stocks. The latter institutions will find borrowers at high rates for all the money they can lend, and none of them will pay their regular dividends or go under the usual amount. But the insurance companies have been unloading heavily, and they held much more bank than railroad stock. The following table will show the depreciation of the best and steadiest stocks in the line of Massachusetts railroads.

	Nov. 9.	Nov. 16.	Nov. 23.
Boston & Albany.....	148	146 1/4	142 3/4
Boston & Providence.....	149	150	146 1/4
Boston & Lowell.....	142 1/2	143	140 1/2
Boston & Maine.....	131 1/4	130 1/2	125 1/2

It is difficult to find any satisfactory reasons for the decline in the first and last of the stocks mentioned. Perhaps some may be found for the latter in the directors' report, which was issued last week.

The holders of stock in the Western roads still hold them. Transactions are merely nominal, and no one wishes to buy even the best stocks, and very little if any in the "Joy" roads has been forced upon the market. In fact it must be some time before there is anything done of any moment in stocks, because there are enough firms and companies whose books were lost by the fire to cause a general uncertainty as to the standing and position even of many of the strongest firms.

WHITMAN.

OLD AND NEW ROADS.

Grand Trunk.

The *Buffalo Commercial Advertiser*, of November 22, says: "The change of gauge on the Grand Trunk Railway between Buffalo and Sarnia recently completed has already had a marked effect on the freight traffic of the road. The New York agents of the road are now making through contracts to Chicago via the New York Central, Grand Trunk and Michigan Central Railroads. The change of gauge obviates the necessity of breaking bulk between New York and Chicago, and the amount of business to be done in the next three months will only be limited by the capacity of the ferry steamer International. On the completion of the International Bridge there will be no obstacles to prevent the Grand Trunk doing as heavy a freight business as any railroad in the country."

Southern Pacific of California.

The track of the Visalia Branch is completed to Salinas City, about ten miles beyond Hollister, the late terminus. Work beyond Salinas City is progressing rapidly.

Canada, Michigan & Chicago.

The *Detroit Tribune*, of November 21, says of this company, the failure of which was recently announced: "Their accounts subsequent to October 16 are unsettled. The road-bed is completed from Ridgeway to St. Clair, excepting a mile at the east end, and an expensive bridge has been built across Belle River. The dock front on the St. Clair River cost \$71,000, and \$25,000 of this has been paid. An attempt has been made to settle up the company's affairs."

Michigan Air Line.

The work of ballasting is going on between Romeo and Washington. The company purposes to complete the road to Rochester this winter.

European & North American.

At a meeting of the stockholders held at Bangor, Me., November 26, the amendments made to the articles of consolidation by the stockholders of the New Brunswick Company were accepted. The consolidation is now complete and will take effect December 1. The two boards of directors will meet at Bangor, December 4, for reorganization.

Philadelphia & Erie.

The City Council of Philadelphia has appointed a committee to inquire into the cause of the non-payment of dividends by this company, about one-third of the stock of which is owned by the city. It is alleged that the Pennsylvania Railroad Company, which leases the Philadelphia & Erie road, is applying the earnings to improvements, instead of declaring dividends. The road has not paid any dividends since its construction. A conference is to be had with the city directors of the road on the subject.

Winona & St. Peter.

The late snow storm in Minnesota completely blockaded this road for a time, and cut off all communication with the large force of men who have been engaged in track-laying on the western end of the line. For a time it was feared that there would be much suffering among these men, but trains sent to their relief succeeded in reaching them. An attempt will be made to continue track-laying through the winter, at least until the western line of Minnesota is reached.

Indianapolis Junction.

A telegram from Indianapolis announces the sale of this road, which has been in the hands of a receiver some time. The sale, which was in pursuance of a decree in bankruptcy, took place November 26, and the only bidders were James A. Frater, President of the company, and D. W. McLaren, President of the Cincinnati, Hamilton & Dayton Railroad. The road was sold to Mr. McLaren for \$1,000,000. The road extends from Hamilton, Ohio, to Indianapolis, Ind., 98 miles, with a branch from Connersville, Ind., to Newcastle, 25 miles, making in all 123 miles of railroad.

[Continued on page 517.]



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Editorial Announcements.

Correspondence.—We cordially invite the co-operation of the railroad public in affording us the material for a thorough and worthy railroad paper. Railroad news, annual reports, notices of appointments, resignations, etc., and information concerning improvements will be gratefully received. We make it our business to inform the public concerning the progress of new lines, and are always glad to receive news of them.

Inventions.—No charge is made for publishing descriptions of what we consider important and interesting improvements in railroad machinery, rolling stock, etc.; but when engravings are necessary the inventor must supply them.

Articles.—We desire articles relating to railroads, and, if acceptable, will pay liberally for them. Articles concerning railroad management, engineering, rolling stock and machinery, by men practically acquainted with these subjects, are especially desired.

Advertisements.—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, except in the advertising columns. We give in our editorial columns our own opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.

EUROPEAN LOCOMOTIVES.

Those of our readers who are interested in the construction of locomotives are recommended to study the engravings, which we give on other pages, of a locomotive built for the Stockton & Darlington Railroad. In an article published in the RAILROAD GAZETTE some months ago, we called attention to the difference in the practice of English and American engineers in designing locomotives. The Stockton & Darlington engine is a good example of the present English practice, or, at least, one which illustrates in a very striking way the differences between English and American engines.

It would be difficult, we think, to induce our American master mechanics to abandon the truck, or, as our English friends call it, the "bogies," notwithstanding the sacrifice of adhesive weight which its ordinary use requires. The verdict of practice here is, that the advantages gained by the use of a truck are much greater than those lost by the sacrifice of a portion of the adhesive weight. Our "Mogul" engines, in their distribution of weight on the driving-wheels, approximate somewhat to the engine we illustrate; but they have not yet, and we do not believe they ever will, achieve the popularity which the ordinary American engine has in our country.

There are, however, many points of English practice, illustrated in the engraving, which are worthy of careful consideration and comparison with what we are doing here. The location of the dome, for example, close to the smoke-box, is now almost unknown here, excepting in some very old engines; and yet it is doubtful whether any good reason could be given for placing it over the fire-box, as we do, instead of the front end, as in the English engine, excepting that in locating it there more weight is placed on the driving-wheels. It would be a very interesting and instructive experiment to attach the cylinder cocks to the dome, which has two domes to it, so that all the water discharged from them would be collected in the tank. By running the engine with the cylinder cocks open all the time, and filling the tank first in one drum and then in another, the amount of water collected would indicate the relative dryness of the steam taken from each drum. Such an experiment would help to determine which is the best point from which to take

steam, and also whether European or American practice in this respect is the best.

The manner in which the crown sheet is stayed in the English engine is also worthy of observation. From the end view it will be seen that the outer shell of the boiler is flat on top and is carried out to meet the sides, so that the general form is square or cubical. The crown sheet is then stayed with bolts passing through the inner and outer sheets, with a nut on the top and bottom. It is said that this arrangement weighs about three-quarters of a ton less than a boiler stayed with crown bars. Many of our readers will remember the manner in which the old Winans engines and those built by Mullholland for the Reading road are stayed. The tops of their fire-boxes and crown-sheets slope downward from the barrel of the boiler and are stayed with bolts in the same, or in a manner similar to that illustrated in the engraving. In that way even a still greater reduction of weight is practicable. It must be remembered that if the weight is reduced any given amount, say a ton, the boiler can then be increased in size to an extent corresponding exactly to that of the reduction in weight, and the economy of a locomotive boiler is increased with its size.

We have heretofore referred to the advantage which the plate frame gives in permitting the use of a wider fire-box, the value of which does not seem to be fully estimated in this country. The clumsy appearance of such frames, and the fact that they hide from view the working parts inside, and also make them inaccessible to careful inspection, and for oiling, have been the objections to the use of such frames. The reasons for preferring our "solid" or "skeleton" form of construction are, we think, amply sufficient to justify our preference, notwithstanding that with it the fire-box is made narrow. But it seems possible, however, to combine the advantages of our form of construction of frames with that of a wide fire-box, by modifying the form of that part of our frames which bears against and is attached to the fire-box. This has been done by Mr. Eddy, the Master Mechanic of the Boston & Albany Railroad, with excellent results. One of the chief difficulties in doing this is to find room for the springs. Mr. Eddy and many English builders place them underneath the frames. In the engine represented by our engraving, the spring for the trailing axle is placed crosswise to the engine, and each end bears on one of the driving boxes. By equalizing the springs for the two front axles, a very good distribution of weight can in this way be effected on a six-wheeled engine, but it is more difficult with eight wheels.

We doubt whether our illustrations will dispose any of our readers to the use of inside cylinders. A glance at the plan of the engine, and the close, crowded and inaccessible position of the parts, especially the valves and steam-chests, will induce those who are obliged to do much work about locomotives to be better satisfied than ever with our method of construction.

There are a great many details illustrated in the engravings which are quite well worth the attention of those interested in locomotive construction, especially the use of two wrought-iron rings at the base of the dome, one of which is shrunk on the outside and the other riveted to the inside of the seam. This plan, very obviously, must increase the strength of the boiler at that point where it is most weakened by the opening for the dome.

Another device which, although not unknown here, has been but little used, is the sliding furnace door. It is somewhat surprising that no one has ever devised a door that can be opened with a treadle, so that the fireman could close it between each shovel full of coal, and have it opened only for an instant when he puts the coal on the fire.

The advantage of the bend in the front end of the tubes must, we think, be purely imaginary. At any rate, the inconvenience of taking out such tubes must be a great objection to their use, especially when impure water is used, or water which forms hard scale.

The feed-water heater in the smoke-stack seems to be one of the innumerable attempts at doing what, for some reason or other, it never seems to pay to do. We have known of quite a number of heaters which, it was said, saved a large percentage of fuel, but which gradually fell into disuse. It seems incredible that if heaters will save five or ten per cent. of fuel they should not be used continuously; nevertheless, such seems to be the fate of all the plans heretofore proposed. The truth is, however, that in such and all similar cases the inventor or constructor of such devices is overmuch favorable to his own invention or device, and quite naturally overestimates its advantages.

The mid-feather, or partition in the fire-box, has never been introduced, or at least used, in this country in any considerable number of engines, and, judging from the fate of all similar devices, is one which will not pay for itself. It is beginning to appear very clearly that complication of parts in a locomotive inevitably results in

much expense, and that the advantage to be derived from any so-called improvement which increases the cost and complication must be very considerable and obvious to justify its use, and that just as soon as any unnecessary parts are removed, just so soon will a source of expense and constant loss be stopped. In making comparisons of one class of engine with another, therefore, the constant aim should be to study to simplify, and even though no such direct result may follow the examination of plans made by others, nevertheless their unsuccessful efforts are often very suggestive, and sometimes indicate how to do things which, without such suggestion, we are unable to achieve. It is therefore always profitable to study carefully matured plans and designs, when they are made by persons of skill and experience. The engravings we give are of this class, and our readers will be amply repaid for giving them a careful examination.

THE RAILROAD QUESTION IN MEXICO.

We have noticed heretofore the contest now pending in Mexico between the promoters of rival railroad schemes. The International Company of Mexico, substantially the same as the International of Texas, proposes an extensive line of the American standard gauge, which will connect with its Texas road; and another company, represented in Mexico by General Rosecrans, would make a still longer line of three-foot gauge connecting with the Denver & Rio Grande at El Paso, the northwest corner of Texas.

The former project is presented in Mexico by Mr. Edward Lee Plumb, recently the United States Consul at Mexico, and is favored by the President of the Republic and its Minister of the Interior. They, however, can only recommend the project, which the Congress now in session must decide upon.

In order to judge at all of the importance of the projected lines, it is necessary to know something of the character and situation of the country to be served; for we must not forget that the roads are to be constructed primarily for the benefit of Mexico, not the United States; and that the fact of the greater directness of the International, which is unquestionable, as a route from the centers of population of the United States to Mexico, may by no means be a conclusive argument to Mexicans trying to serve Mexico, however much it might be to people of this country looking out for its interests.

We may look upon Mexican railroads as intended to serve three principal purposes: first, communication with Mexican ports; second, communication with the United States; third, intercommunication.

Of these, doubtless, the last is the most important to Mexico—at least in its present condition, without very heavy exports or imports. The first may not be more important to Mexico than the second; but doubtless Mexicans would so consider it, for they naturally desire that their exports and imports, at least to and from other countries than the United States, be made through their own ports. The second is the most important to us, as it will enable us to send our goods to the Mexican market, and facilitate an export and import trade which may become very important.

As the Mexicans are to pay, in large part at least, for their railroads, we should all desire that they may be planned for the best good of Mexico; especially as we cannot well grudge that unfortunate country any degree of prosperity which its exertions may obtain for it, and its value to us is likely to be governed more by its general prosperity than by the closeness of its connections with us.

Mexico has now one railroad to be completed by the close of the year, extending from its chief port on the Gulf, Vera Cruz, west by north over an extremely difficult country to the city of Mexico. This road has been under construction for many years, and has been extremely costly. It is of the standard gauge. So communication between the capital and the Gulf coast is already provided for. This, however, is the only line (except a branch of it to Puebla) in the country. The situation is not at all like that of the United States. Here we push new railroads into the uninhabited wilderness to open new districts to settlement; in Mexico the oldest and most thickly-peopled districts are entirely without railroads, and evidently the first effort should be to give these an outlet.

The population of Mexico is quite as various in density as in the United States. The northern States are almost a wilderness; those on the Texas border and the coast are for the most part thinly peopled. The bulk of the population is in the interior and around the city of Mexico and north and northwest of the city. This populous district is reached by the line to Vera Cruz. Evidently the most necessary railroads now are those which will connect the cities and towns of this populous section with the railroad already completed. Thus communication with the seaboard and intercommunication will both be secured.

Draw a line from Camargo, on the Rio Grande, near the proposed terminus of the International of Texas, southwest to Mazatlan. Very nearly one-half of the territory of the Republic lies north of that line, but only about one-twelfth of the population; and no single State north of that line has any considerable population; that of the whole, including a territory fifteen times as large as New York or Pennsylvania, having probably less than a million inhabitants. The States on the line of the Vera Cruz & Mexico Railroad, on the other hand, have three-tenths of the total population of the country, and five States north and northwest of the State of Mexico, three of them very small ones, and all together having but one-eleventh of the area of the country, have two-tenths of the population. The two States between those last described and the Pacific coast again have less than one-tenth of the area and about 17 hundredths of the population of the country. Thus we have in a belt of country about 400 miles from north to south and 500 from east to west, extending from the Gulf to the Pacific, two-thirds of the population of the Republic in about one-fourth of its area, altogether having an area about three times as large as the State of Missouri.

We see, then, that the chief population of Mexico is, as it were, immediately around the capital. The States bordering on Texas are thinly peopled, and those next our Southern border are almost a desert. It is evident, therefore, that the most promising field for railroads is within two or three hundred miles of the capital, where the States are comparatively populous and there are many considerable cities. For six or seven hundred miles south of the United States border and west of the Rio Grande there are few people to serve, and, we may conclude, an unattractive country; for a want of transportation facilities is hardly an excuse for a lack of population in Mexico, where one part of the country is quite as destitute of railroads and canals as another.

As nearly as we can learn, the two projects are very nearly alike so far as concerns the routes in the interior of Mexico, where the population is greatest, and unlike chiefly in their connections with the United States. We are able to give pretty definitely the route of the lines proposed by the International Company, which counts among its members some of the wealthiest capitalists of the United States, such as Moses Taylor, Wm. E. Dodge and William Walter Phelps, of New York, who have important railroad interests in Texas, abundant resources of their own, and a reputation for character and judgment which enables them to command the confidence of other capitalists. There would seem to be hardly any question but that this company will be able to carry out its part of such an agreement as Mexico may make with it.

As we have said, a railroad of the standard gauge is to be completed from Vera Cruz to the city of Mexico by the end of this year. This latter city is in what is called the "Federal District," answering to our District of Columbia, about the center of the State of Mexico. The International purposes, if its proposition is accepted, to begin the construction of a railroad from the city of Mexico, within nine months from the time the Vera Cruz line is completed, in a general northwesterly direction through the States of Mexico, Queretaro and Guanajuato, and the cities of the same name, to the city of Lagos, 268 miles. The line so far will be substantially an extension of the Vera Cruz & Mexico road in the same general direction. The States on the line of this section have an aggregate population of 1,675,000, and on it are the city of Mexico, with 200,000 inhabitants; Queretaro, with 47,000; Guanajuato, with 63,000, and Lagos, with 80,000—a row of towns such as few railroads in this country have on a line of equal length, and comparable to Buffalo, Erie, Cleveland and Toledo on the Lake Shore road from Buffalo to Cleveland. There is to be a branch from Salamanca on this line southward to Morelia, 75 miles; and one from Silo to Guanajuato, 16 miles, making the entire length of this road 339 miles. This is the section to be first undertaken, and it is evident that with such a population and so important towns, it ought to have a large traffic immediately. It is doubtless the most important part of the whole proposed system.

From Lagos it is proposed to construct two lines, one to the Pacific coast (either northwestward or southwestward), and one northward and northeastward to the Rio Grande (Rio Bravos del Norte, the Mexicans call it) at the terminus of the International of Texas. The route of the Pacific line seems to have been determined only to Guadalajara, 128 miles westward from Lagos; but thence to the Pacific coast, whether northwest, west, or southwest, the distance will vary little from 334 miles. Thus we would have a transcontinental line 893 miles long, the lengths of the three sections being:

Vera Cruz to Mexico.....	339
Mexico to Lagos.....	268
Lagos to the Pacific.....	286
Total.....	893

Thus the continent would be crossed at this place by a line just about as long as the shortest between New York and Chicago.

The connection with the International of Texas would be made, we have said, also by way of Lagos. The route is not fully determined for the entire distance, but it will be northward from Lagos 44 miles to Aguascalientes; thence there will be two lines, one north to Zacatecas, 75 miles, and the other eastward to San Luis Potosi, 104 miles. The extension to the Texas border may be made either from Zacatecas or San Luis Potosi, and from either will be about 469 miles. The distance from Lagos to the Rio Grande then will be 588 miles or 617, according as it is made by Zacatecas or San Luis Potosi, and in either case this section of the line with its branch will be 692 miles long.

Nearly all of these railroad lines, except a section nearest to the Texas border, will be through a country which has a considerable population, and there is north of these routes scarcely any country which is not very thinly peopled.

The entire length of railroad, main lines and branches, projected by this company, is thus 1,413 miles. The lines form a harmonious system, extending through most of the populous States, having a common center at Lagos, with outlets indifferently to Vera Cruz, the Pacific, and the United States. All but a small part would be needed if it was intended to concentrate the traffic of the country at Mexico and Vera Cruz, and avoid all communication with the United States; yet they will afford, when connected with the International of Texas, the most direct connection practicable with the railroad system of the United States, and to all parts of the country as far west at least as Texas. It will not be a direct line to the city of Mexico, which is indeed due south of the terminus of the International on the Rio Grande; but the character of the country is such as to make a direct line impracticable. Mexico is on the 99th meridian, and to reach it the International would go first to Lagos, west of the 103d deg. The distance from the Rio Grande to the Pacific would be 950 miles, a little further than the distance from Vera Cruz; to the city of Mexico it would be 856 miles. The distance from the Rio Grande to New York by way of the International of Texas being 1,959 miles, this gives the distance from New York 2,909 miles to the Pacific and 2,815 miles to the city of Mexico. The distance would be much less from Chicago, St. Louis, etc., the route from these cities being as direct as possible.

The International Company asks of the Government of Mexico a subsidy of \$9,500 per kilometer (about \$15,200 per mile), payable in debt certificates bearing no interest, but receivable for custom duties, 8 per cent. of which must be paid in such certificates. All its materials are to be admitted duty free for 15 years, during which time it is to carry the mails without charge. It is also to have the right of way and the necessary land through all public lands. No subsidy is to be paid until after the completion of 50 miles of road; afterward it is to be paid as sections of 12½ miles are completed. The company is bound to complete 50 miles of the line from Mexico to Lagos within two years from the completion of the road to Vera Cruz.

The route of the narrow-gauge project we cannot describe so definitely, but we believe that it purposes a main line from Mexico to Lagos, and one from Lagos to the Pacific, very much as the International does, and also a line northward from Lagos, which would not be far from the International's proposed line to Zacatecas, which is 119 miles long. But from the last point the narrow-gauge road would extend, not northeastward, but northwestward, reaching the Rio Grande at El Paso, the distance by an air line being 650 miles, and the country throughout its whole extent very thinly peopled. A subsidy of \$10,000 per kilometre (about \$16,000 per mile) is asked for the main line and half as much for sundry branches. The connection with the part of the United States east of the Rio Grande would be very indirect, as the line would make an angle of 60 or 70 degrees with the line of the Texas & Pacific from El Paso eastward. It would be a direct continuation of the Denver & Rio Grande, and would form probably the shortest practicable line from Mexico to New Mexico and Colorado; but of course the value of such a connection is infinitesimal, compared with that of one with the States further east, the total population of these two territories not being equal to that of a second-rate Western city.

It is preposterous that more should be asked for a light, cheap, narrow-gauge railroad than for a heavy road of the standard gauge; and it will be extraordinary if Mexico should pay the larger subsidy to secure the less convenient and capacious line. Doubtless a narrow-gauge railroad would be very much better than none, and, probably

enough, for some time the narrow line could be made to carry all the traffic that would offer, as it certainly would in the States of Durango and Chihuahua; but when the question is a good railroad for one sum and a poorer one for a larger sum, it is strange that there should be any division of opinion, as there is said to be in Mexico.

Either system, however, may be of immense value to Mexico. Very much more than it needs railroads or anything else, doubtless, that country needs internal peace and permanent order; but the railroads come next in desirability, and it is believed that they may assist materially in securing the first desideratum. There are people enough, and with order there would doubtless be production enough to amply support an economically constructed system of roads through all the States which have an average population of 12 or 15 per square mile; and if order is maintained for a few years, we have no doubt that some such system will be constructed. Rarely can there be found on the surface of the globe at this day so large a civilized community so utterly destitute of facilities for transportation; for Mexico has scarcely any navigable streams, no lakes of importance as transportation routes, no canals of moment, and as yet only one railroad.

The Illinois Central Management.

An English railroad journal has recently attacked the management of the Illinois Central Railroad Company, charging it with perpetrating or permitting gross abuses in connection with contracts for supplies, etc., with permitting the property to depreciate greatly in value for want of proper renewals, etc., and generally to have brought it into a wretched condition where it will pay no dividends. Apparently to give a comic turn to this tragic tale, it suggests as a remedy for this bad condition of things a reorganization under Mr. James McHenry and his associates! who, we suppose, are to lead it from the dismal wilderness of 10 per cent. cash (and occasional stock) dividends to the flowery fields where such properties as Atlantic & Great Western delight admiring stockholders.

It is no new thing for managers to be charged with mismanaging railroad properties and profiting by their mismanagement, and, alas! it is no new thing for them to do it, and not so uncommon as to make such a charge against an unproved management utterly incredible. But the Illinois Central has no new and untried management. The direction of this company's affairs has been substantially the same for a long series of years. It is creditable with whatever of bad and good there has been in the policy of the company for all that time. It has, indeed, made a record, by which—and by it alone—we are justified in judging it. When we have intrusted our property to an administrator for a number of years, we can form some idea of his capacity and honesty by comparing the present condition of the property with its condition when he took it in charge, and considering its returns meanwhile. Let us do something of the kind with the Illinois Central.

At the close of 1862 the Illinois Central had a bonded debt of \$15,060,500, its construction and equipment account amounting to \$27,675,671. Ten years later, at the end of 1871, its bonded debt was \$5,764,500, the Land Department holding \$13,299,000 of its bonds. The construction and equipment account then amounted to \$33,610,185. Thus the company owned a property which had cost \$5,935,000 more, and had reduced its debt by \$9,300,000. Meantime it had received \$9,340,000 from sales of land, and reduced the estate of the company from 1,396,674 acres to 379,210. The increase in construction account is not fictitious, but represents an increase of rolling stock, not simply to meet the enormously increased traffic of the company's own lines, but that of 400 miles of other road which it now works under a lease. In 1862 it had 112 locomotives, 94 passenger cars and 2,335 freight cars; in 1871, 193 locomotives, 162 passenger cars, and 4,344 freight cars. It has also made great improvements in the road itself.

Comparing incomes, we find that the receipts in 1862 were \$3,445,827, and in 1871, from the same lines, \$7,053,440.

Neither has this progress been made at the expense of the stockholders. They have had 10 per cent. cash dividends every year, we believe, and two 10 per cent. stock dividends; the capital stock and funded debt are now four or five millions less than the cost of the property, and the reduction in the debt has been made while making these large expenditures on the road and equipment.

Still, we can see that managers might be honest and economical, and yet fail in foresight and enterprise. During the past few years numerous new competitors have entered the field in which the Illinois Central works, and there have been modifications in the routes of traffic and its sources which have needed constant watching and new provisions. Now it may be considered a sufficient evidence that the Illinois Central's affairs have been managed well, that its earnings are so large. But when we consider what has been done, we will see that scarcely any company has succeeded in securing traffic from so many new sources while constructing no new road. Aside from the leased Iowa lines, now hardly profitable, but sure to become so, and forming a part of the most direct route for the traffic on their routes, whether water or rail be the favorite outlet to the East, it has made many combinations with other railroads. Thus it has established connections by which traffic between Chicago and St. Louis, St. Louis and Cairo, Chicago and Springfield, Chicago and Cincinnati and Chicago and Keokuk pass over parts of its lines, and has recently secured the passenger traffic between Chicago and Dubuque. This disposition to make use of lines which intersect its own, and make them bring it more than they take away, is a peculiarity of the Illinois Central management which does it much credit. Instead of fighting against

the natural tendencies of traffic, it has recognized and as far as possible provided for them.

The foundation for the present attack, doubtless, is the considerable decrease in earnings this year, so far a little more than 5 per cent., a decrease which it shares with similar roads—that is, roads in a similar direction—in the same section, and which is in no respect mysterious, unaccountable or unnatural. It is caused by two circumstances working together—one the multiplication of east-and-west railroads crossing both lines of the Illinois Central south of the latitude of Chicago, and affording at the crossings shorter all-rail routes to the East than the Illinois Central can give; and the other the extraordinarily high rates on grain shipments by lake from Chicago to Buffalo, which have left the long lake-and-rail route, in which the Illinois Central is a very important part, with scarcely any advantage of cheapness over the short all-rail route which the east-and-west railroads afford from two-thirds of the country through which the lines of the Illinois Central run. Grain will not go far out of the most direct route to reach Chicago, unless rates from Chicago eastward are very low, as they almost always are on the lakes. While the Illinois lines of the Illinois Central are for the most part north-and-south roads, nearly all the produce of the country on these lines goes to the East for consumption. When the Central forms part of the cheapest route to the East, it carries most of this produce; otherwise, not. The fact that the company has earned so much under circumstances so unfavorable should be cause of congratulation to the stockholders, and not of dissatisfaction with the managers, one would think.

There are, perhaps, some people who do not appreciate that management which at the same time improves a property, pays its debts and makes large dividends from its earnings. These may find fault with the Illinois Central management. They see no likelihood of its forcing the capital account up to one or two hundred thousand dollars a mile, and making fortunes for sundry rolling-stock companies, etc., in which they have an interest. These may clamor for "reorganization," especially if they hold no shares; but the stockholders who prefer dividends to promises, and solid prosperity to poverty or bankruptcy, will probably be quite satisfied without a change.

As we have said, the record the managers have made in their conduct of this property for so many years is the best evidence of their ability and integrity, and this record must be too well known to the shareholders of the company to need that it should be presented by us at this time. But we have an interest in this matter which extends further than the shareholders and the managers of this company and a desire that justice should be done as between them. Illinois Central is one of the few American stocks largely held by Englishmen which has proved profitable. For some reason the unlucky, or preposterous, or mismanaged companies seem to have succeeded best in attracting English investors, and they have for the most part carefully avoided the numerous profitable and honorably managed railroads. The natural effect has been that American securities, and especially American railroad shares, are looked upon with suspicion in England. Illinois Central has been an eminent example on the other side, and has had and has very much to do in maintaining American credit in England. A malicious paragraph, quite without justification in fact, may do very little injury to the company in question, but if the impression should prevail that the Illinois Central has become the prey of the American railroad spoiler, among those who care too little about its shares to inquire into the truth of the charge, the effect might be serious on American credit in England.

The Northwestern Corner and the Suit against Jay Gould.

The event of the week (and last week) in Wall street is of course the great corner in Chicago & Northwestern common stock; though to call it a "great" corner may be thought a misnomer, for it was doubtless the strangest and narrowest and smallest corner that great "operators" were ever squeezed into. The story is an entertaining one, and doubtless not unprofitable; but the daily papers told it so fully and in such detail that we cannot expect to add anything new, and it will hardly be worth while to tell the tale in full.

One pool having secured pretty much all the Northwestern common stock, usually worth about 70, the bear pool, having large contracts to deliver this stock at 82 or 85, have been compelled to buy it of its rivals at their own price, which seems to have varied from 125 to 230, according to the wealth of the respective bears, it being a principle of the bulls, apparently, to take from a man no more than he owns. The combinations for these speculations have involved most of the leading speculators in railroad stocks, and among them men who are or have been prominent railroad officers, as Horace F. Clark and Augustus Schell, President and Treasurer of the Lake Shore & Michigan Southern, and directors in the New York Central and Union Pacific, etc., and Jay Gould, late President of the Erie, of the successful bulls; and Henry N. Smith, President of the Hannibal & St. Joseph, and Daniel Drew, formerly Treasurer of the Erie, of the bleeding bears. Much of the success of the operation seems to have been due to a strong combination between the "Vanderbilt" operators—Clark and Schell—and Jay Gould, who has rarely worked with these men or men of their class, and who was thought to be hardly acceptable in their company. And Mr. Gould's choice of his position is said to have been due to his discovering an assailable position in Mr. Henry N. Smith by examining the books of a firm in which they are both special partners, through which Mr. Smith had made heavy contracts! But the exclamation point is perhaps superfluous, as we have witnessed so many instances of dishonorable conduct on the part of certain parties that we ought not to be astonished at anything. But, in one way or another, the corner was made, the bears were bled, sev-

eral millions will be divided among the successful bulls, and there remains now little more than a suit against Mr. Henry N. Smith, who offered to make his deliveries in preferred instead of common, the latter standing 87 during the first period of the corner, and touching 102 when a demand for it was anticipated. It is said that a settlement at 230 would cost Mr. Smith about four millions, and that Mr. Drew must have lost about a million and a quarter by his speculation; but these losses do not leave them destitute, and the corner so far has left few indications of its existence.

On Saturday of last week, when the fact of the corner was fully established, Mr. Jay Gould was arrested, at the instance of Mr. Peter H. Watson, the present President of the Erie Company, in a suit for \$9,726,541.26, with interest, claimed as damages for the "fraudulent detention, embezzlement and misappropriation of the moneys and property" of the Erie Railway Company by Gould when President and Treasurer. This arrest was based partly on accounts of Gould in books of the late firm of Smith, Gould, Martin & Co., which were supplied to Mr. Watson by Mr. Henry N. Smith, and supported by his affidavit. Naturally enough, it was supposed that this arrest was made in order to embarrass Gould's "corner" operations, and it might have had that effect if his associates had not immediately given bail for him; but it has since appeared that the books were submitted some time previously, and that the quarrel between the two former partners was of more than a few days' standing.

The charges against Gould are chiefly in connection with the issues of new shares made during his administration, and the disposition of their proceeds. Out of one issue of about 400,000 shares, he is charged with having retained about \$4,500,000 of the proceeds; an additional sum of about \$3,000,000 standing to the credit of the company on the firm's books he had transferred to his own account. Having a large amount of stock which had depreciated in value on his hands, he procured an order of the court authorizing the company to repurchase and cancel a large amount of stock, under which order he had about \$7,500,000 of his own stock bought at something more than twice the market price. Also it is charged that two issues of stock, amounting to \$3,000,000 were sold for \$660,000, and the proceeds embezzled by Gould and never accounted for; and there are other similar charges of smaller embezzlements.

The trial of this suit, it is to be hoped, will show clearly the various ways in which the Erie Company was robbed for so many years, and the persons guilty; and it is to be hoped, too, that the criminals may be brought to justice. But Gould pleads that he has received a release by the company from all actions whatsoever for any cause occurring before December, 1871, and he shows such a release signed by a committee of the directors and the Assistant Secretary, under the seal of the company. Whether this release will be held good, we shall doubtless know in due time. If it is not, then this suit may be of more real importance than the Northwestern corner itself.

Record of Track Increase.

This number of the RAILROAD GAZETTE gives information of the construction of the following sections of new railroad:

Chicago, Clinton & Dubuque, from Sabula southward 12 miles to a junction with the Iowa Midland four miles north of Clinton, Iowa. Davenport & St. Paul, extended northward 10 miles to Yankee Settlement, Iowa. Paris & Decatur, extended from Lovington westward 20 miles to a junction with the Illinois Central near Decatur. International, extended northeastward 22 miles to Troupe, Texas. Williamstown, completed from Atco eastward to Glassboro, N. J., 15 miles. Chicago & Northwestern—Menomonee Extension, extended on the southern section northward 9 miles to a point 32 miles north of Menomonee, and on the northern section southward 8 miles to a point 15 miles from Escanaba, making a total extension of 17 miles. Green Bay & Lake Pepin, extended from Plover westward 15 miles to Grand Rapids, Wis. Lake Erie & Louisville, extended from Beaver Dam southward 12 miles to Lima, Ohio. Hannibal & St. Joseph—Atchison Branch, completed from St. Joseph southwest down the east bank of the Missouri to Winthrop, Mo., opposite Atchison, Kan., 21 miles. Southern Pacific of California, extended from Hollister southward 10 miles to Salinas City, Cal. Chicago & Michigan Lake Shore—Big Rapids Branch, track laid from Muskegon, Mich., northeastward 18 miles. Canada Southern, track laid from the western terminus at Amherstburg, Ont., east by north 40 miles; and on the St. Clair Branch from Moore's (opposite St. Clair, Mich.) eastward 40 miles to the intersection of the Great Western. Wisconsin Union, extended from Deerfield, Ill., south to Chicago, 25 miles, completing the line from Milwaukee to Chicago. Chicago, Pekin & Southwestern, completed by the laying of track from Minook to Euroka, 16 miles. Traverse City, extended south-eastward 9 miles to a junction with the Grand Rapids & Indiana, completing the road.

This is a total of 300 miles of new railroad.

THE WATSON MANUFACTURING COMPANY, our readers will remember, had its works at Paterson, New Jersey, almost entirely destroyed by fire on the 30th of October. Since that time it has been steadily and industriously at work rebuilding its works. Since the fire it has occupied temporarily shops rented for the purpose, and is working night and day in order to complete its contracts.

They now have the foundry roofed in on the old walls, which were not seriously injured by the fire, and have thirty moulders at work. The new shop on Railroad avenue will be 75 feet deep, with a front of 51½ feet, and will be four stories high. Adjoining this will be another building three stories high and 120 feet by 44. The first floor of this will be used for bridge building, and the second for general machine work, the third for light manufacturing purposes.

The drawing-room will also be on this floor. In addition to these buildings there will be an L on Grand street, 150x56 feet, also three stories high. These buildings are all well advanced, and it is expected that they will all be under roof before Christmas.

The company now has 135 men at work on bridges in the shops, 85 in the foundry and 86 erecting, a total of 306 in their ordinary work. It has also 141 masons and laborers, 55 carpenters and 12 wagons and carts at work on the new buildings. It will thus be seen that the company will soon be in better condition and have better facilities to build bridges and do other work than ever before, and that the fire has, in reality, caused comparatively little interruption to their business.

CONDUCTORS, so a jury has decided, must defend their passengers; and if they don't, the companies employing them are held responsible for any damage the passengers may suffer from assaults on its cars. Mr. Avery D. Putnam was assaulted and fatally injured while on a car of the Seventh Avenue Railroad in New York. His widow sued the company for damages, alleging that her husband would not have been killed if the conductor and driver had interfered as they should have done. On this plea she recovered \$5,000. The suit was tried before Judge Curtis, in the Superior Court of New York.

THE FIFTH ANNUAL REPORT OF THE MASTER MECHANICS' ASSOCIATION is printed and ready for distribution, and will be sent to all the members whose address the Secretary is able to get. Any member who has failed to give his post-office address to that officer will have no right to complain if he does not receive the report. If any of the members have failed to advise Mr. Setchel of their local habitation, let them instantly do so, or else hold their peace if they do not hear from him.

"HOOSIER" is prevented from continuing the papers on "Practical Field Engineering" for a few weeks by reason of professional duties keeping him constantly in the field locating a railroad. The series will be resumed in a short time.

English Freight Locomotive.

The following description and the accompanying engravings are of a freight locomotive, designed and constructed for the Stockton & Darlington Railway. We take them from *Engineering*:

The work to be done on the Stockton & Darlington line is of a very heavy character, and the engines we now illustrate weigh over 37 tons each in working order, and have six wheels coupled, and inside cylinders 17 in. in diameter, with the unusually long stroke of 28 in. The heating surface also is large, so that the engines are of a very powerful type, while they also include many novelties of detail which give them a special interest. What these peculiarities are will appear in the course of our description.

The cylinders are fitted with solid cast-iron pistons, i. e., having no cover bolted on. These pistons have each one cast-iron packing ring run with white metal and sprung into its place. A brass tongue crosses the joint and is kept in place by a spring butting against the packing nearly all round the piston and with its ends resting on the tongue. The latter has a lip projecting beneath the packing ring, thus preventing all chance of its coming out.

The piston rods are of steel, and are attached by keys to the cross-heads in the usual manner. The slide rods are of Bessemer steel throughout. The cross-heads are of the usual double-cheeked pattern, with gudgeon and two motion blocks.

The motion bars are made trough-shaped top and bottom, and have a rubbing surface 4 in. wide on each side; they are not carried up to the cylinders, but attached by feet to the underside of a strong angle stay passing between the frame plates. This plan recommends itself as affording greater facilities for packing the cylinder glands, and gives a better working space underneath for repairing the engine. The other ends of the motion bars are attached to the motion plate by feet in the ordinary way.

The eccentric straps are cast steel, and the link motion is of the ordinary shifting skeleton type, the lifting links having broad wings forged on, and wide enough to prevent the eccentric-rod bolts from coming out at their greatest travel.

The crank axle is of forged iron, the cheeks having each a wrought-iron strap shrunk on. This method has been proved by experience to afford a certain amount of safety in case the axle should be fractured through one of the cheeks.

In addition to the injector, there are two short-stroke pumps, the right-hand one of which is used to pump the water direct into the boiler, or it may be made to throw the feed water into the chamber surrounding the chimney by opening the valve seen on the right side of the engine near the motion plate (see the two-page engraving), the water being prevented from entering the boiler by the pressure on the back of the boiler clack; but we will return to this in describing the chimney feed-heater.

The left-hand pump is used only as a boiler feeder, and draws its supply either from the chimney feed-heater, or direct from the cold-water tank by closing the valve and cutting off the communication from the former and opening the valve leading to the latter.

The axle-boxes are entirely of brass, and lined with white metal, and the axle-guides are fitted with wedges to take up the wear. The cross-springs have adjustments as well as all other springs. The wheels are of wrought iron with wrought-iron case-hardened crank pins and steel tires.

The boiler is supported by and slides upon the motion and pump plates. The tubes are cambered downwards at the ends entering the smoke-box for the double purpose of forming a heat trap, and also to give them a certain amount of longitudinal elasticity, and thus enable them to better adapt themselves to expansion and contraction.

The fire-box has a longitudinal midfeather, and in place of the ordinary roof ribs, the outer case is made flat, and stayed through to the inner box; this, in addition to being a much stronger arrangement than the roof ribs, possesses the additional advantages of three-quarters of a ton less weight on the back or trailing axle. We believe this method of staying the roofs of fire-boxes originated at Sheldon Works, and was practically carried out there about 10 years ago.

The steam dome is placed at the end next the chimney, this position having been chosen in designing the engine for the purpose of giving more weight on the leading wheels, and also because the boiler barrel, having to be cut for the steam pipe, would be stronger if the dome was placed next the tube plate than in any other part of the boiler. In practice this position is found to be all that could be desired, giving dry steam.

For the further purpose of strengthening the dome and the boiler at that part a malleable iron ring 3 in. by 1 in. is shrunk

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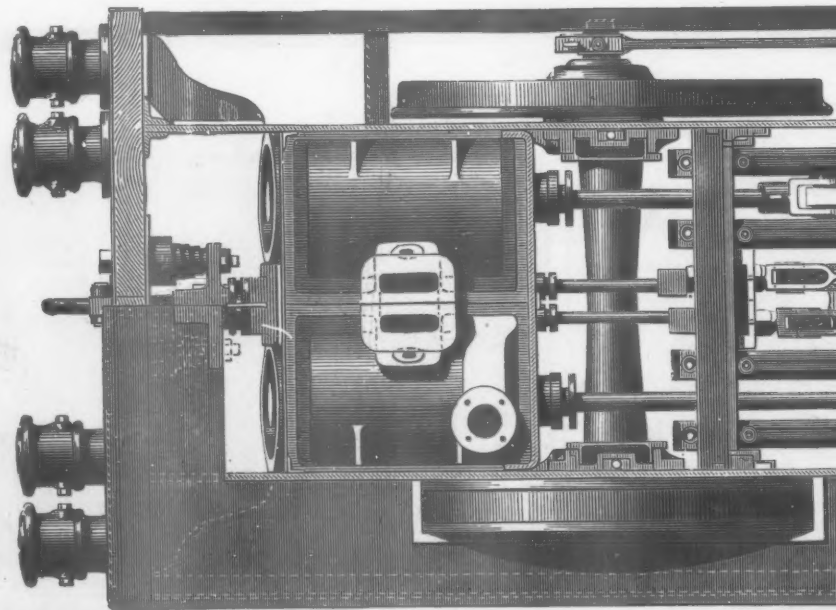
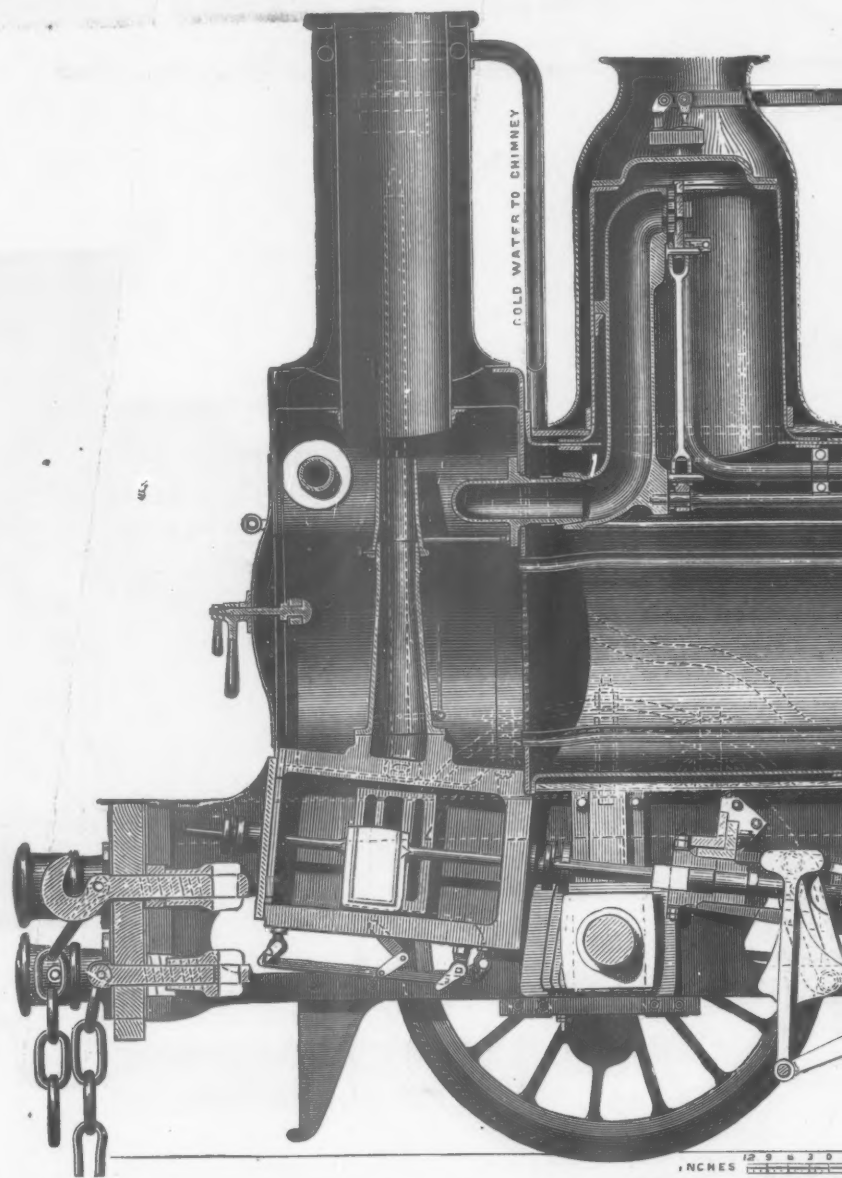
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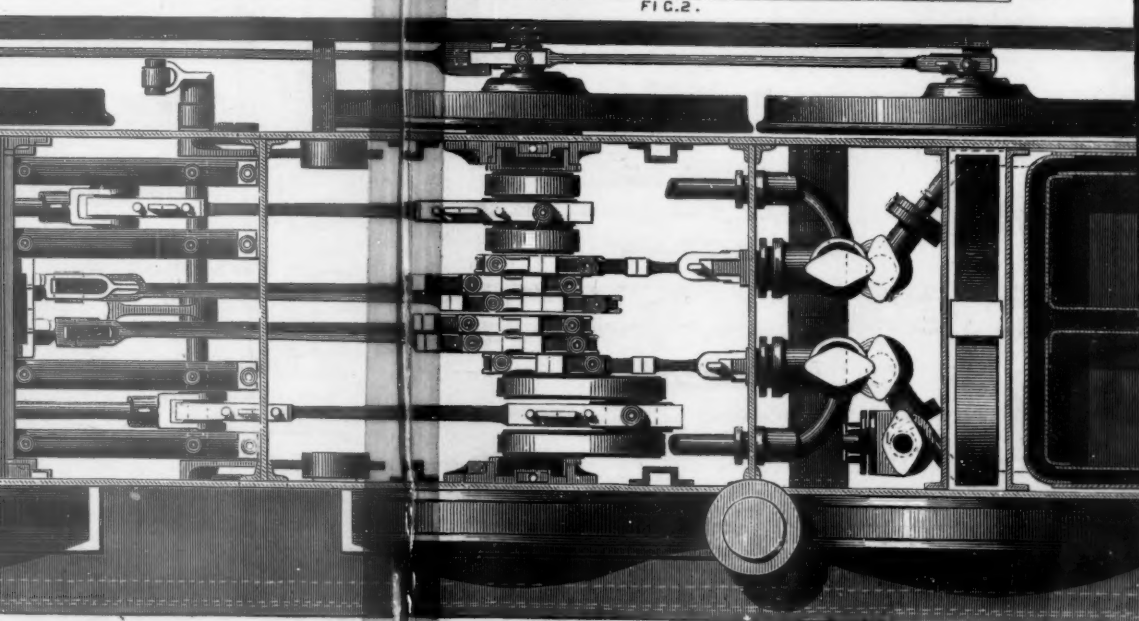
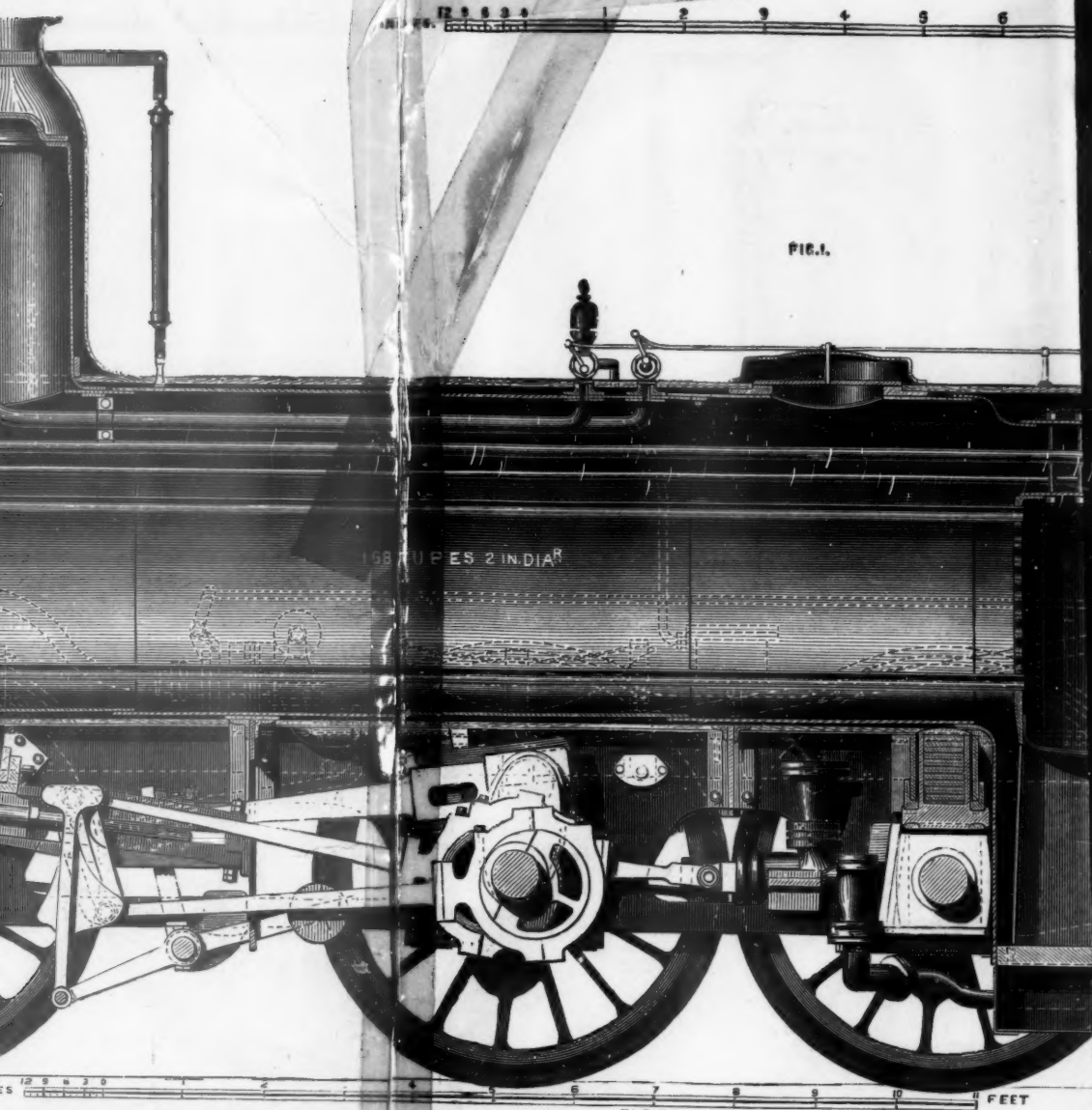
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FREIGHT LOCOMOTIVE



ST LOCOMOTIVE FOR THE STOCKTON & DARLINGTON RAILWAY

By Mr. WM. BOULTON, LOCOMOTIVE SUPERINTENDENT.

INCHES. 12 11 10 9 8 7 6 5 4 3 2 1 FEET

FIG. 1.

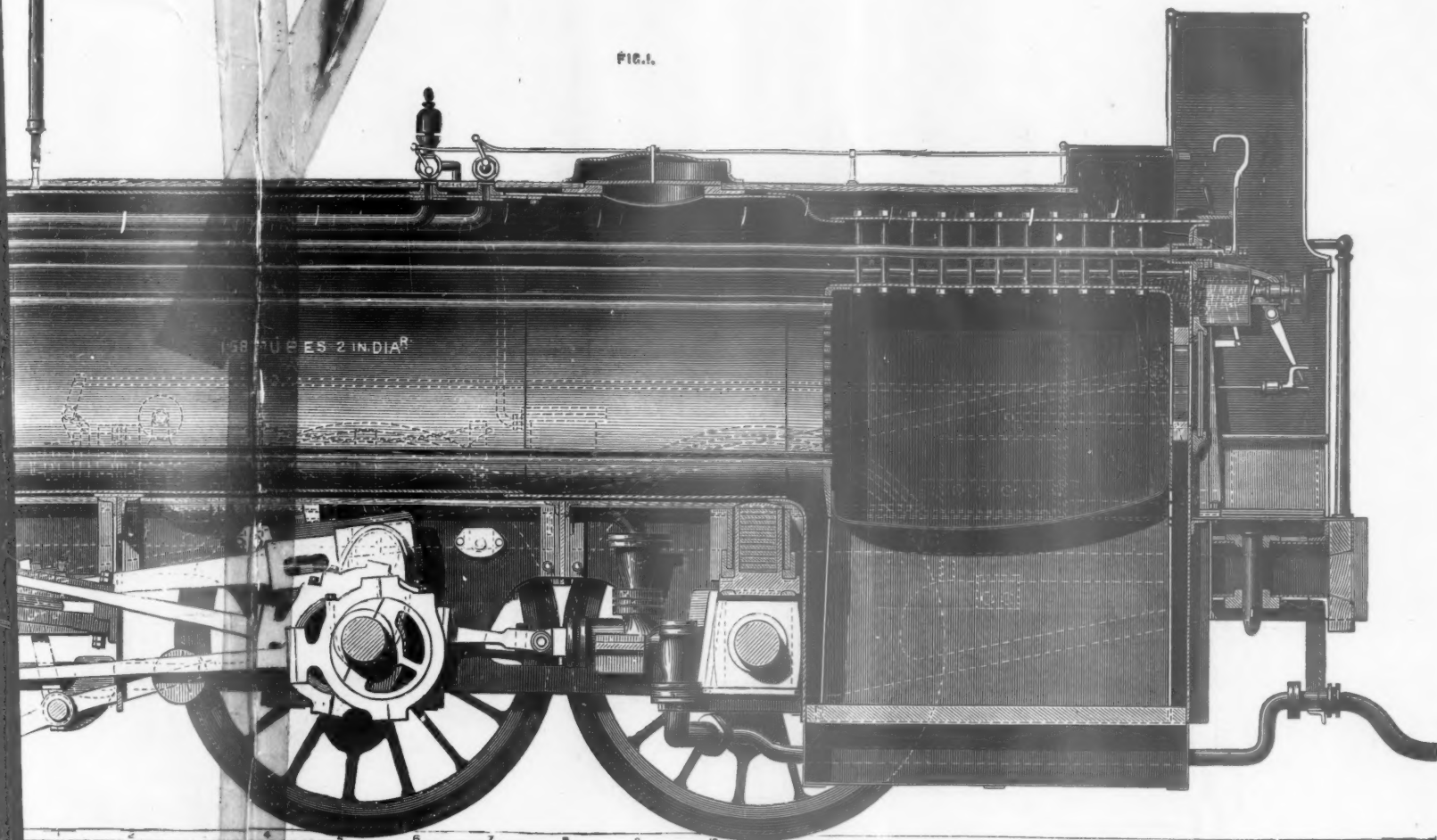
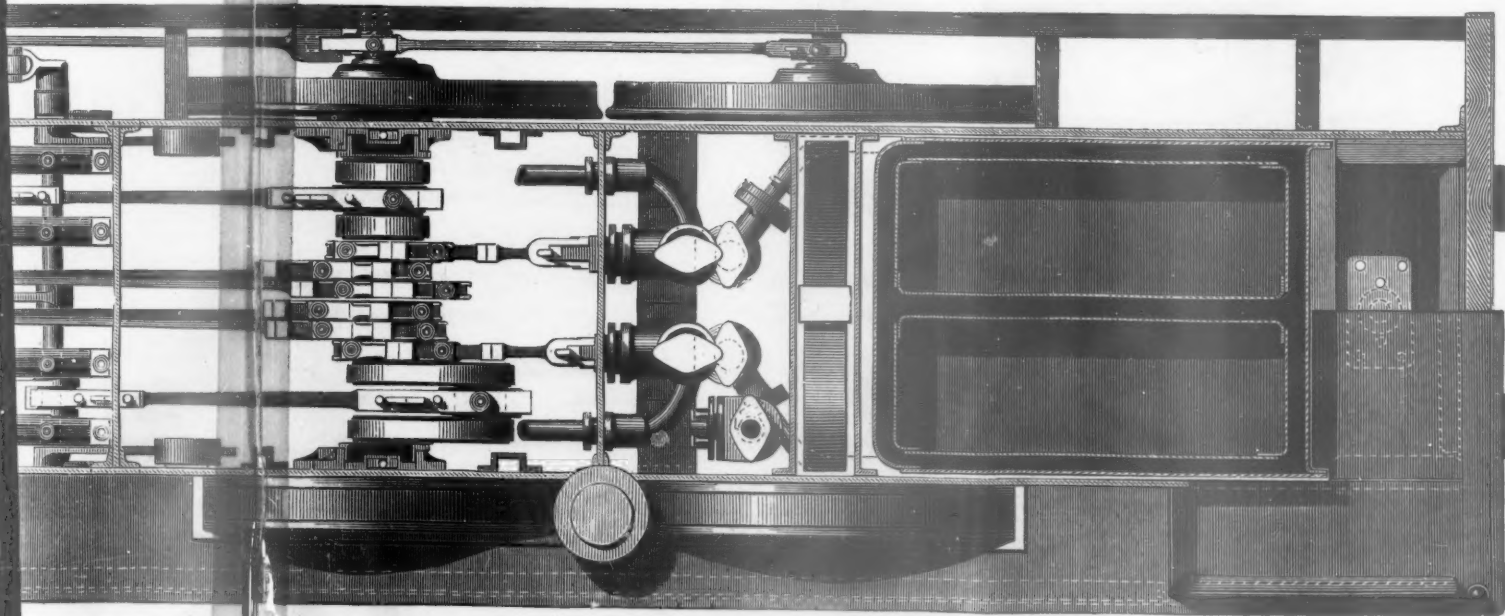
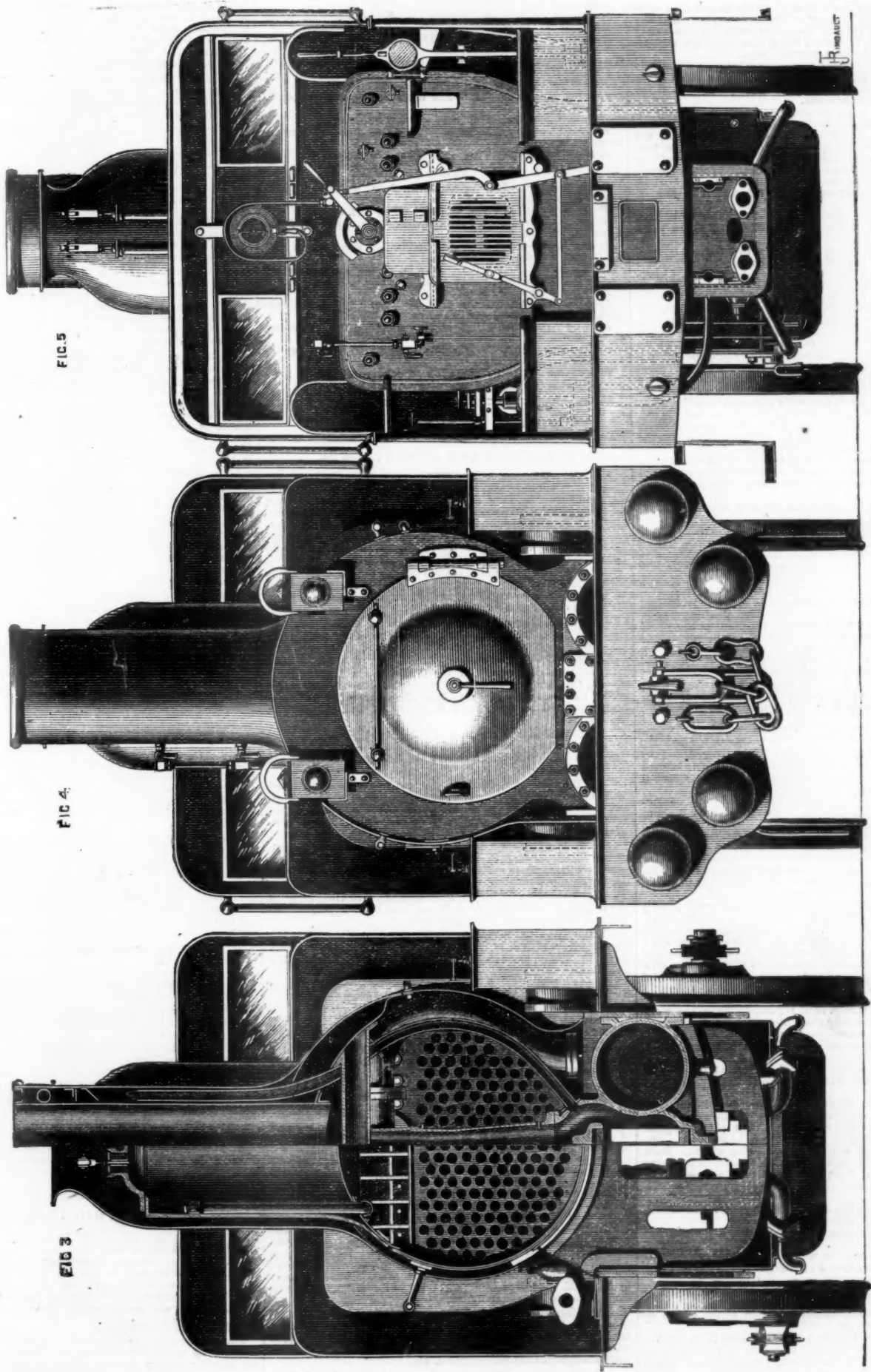


FIG. 2.



LOCOMOTIVE FOR THE STOCKTON & DARLINGTON RAILWAY.

By Mr. WM. BOULT, LOCOMOTIVE SUPERINTENDENT.



END VIEWS AND TRANSVERSE SECTIONS OF A FREIGHT LOCOMOTIVE FOR THE STOCKTON & DARLINGTON RAILWAY.

for the great fire, near the head of South Water street. The company is building large shops at Detroit Junction, about three miles west of Detroit. This is done in order to remove the present shops, which are in the way of the tunnel now in process of construction under the Detroit River.

Mr. M. D. Woodford, Superintendent of Telegraph and Chief Train Dispatcher, has resigned his position to take the responsible place of Assistant General Superintendent on the Great Western Railway. The resignation takes effect on the first of December. Charles C. Reed, Esq., who has been in the service of the company about nine years as train dispatcher, has been appointed his successor.

Chicago, Pekin & Southwestern.

This road is now completed and has been accepted by the board of directors. George D. Dana is to have the superintendency of this road.

Lake Shore & Michigan Southern.

The following is a correct time-table of the new trains which run between this city and the Union Stock Yards:

Trains going south leave as follows:		
Harrison st.	Stock Yards.	43d street.
Leave... 6:50 a. m.	Arrive... 6:45 a. m.	Arrive... 6:55 a. m.
"... 7:35 "	"... 8:15 "	"... 8:25 "
"... 8:45 "	"... 10:30 "	"... 10:40 "
"... 12:15 p. m.	"... 1:00 p. m.	"... 1:10 p. m.
"... 2:15 "	"... 3:00 "	"... 3:10 "
"... 4:10 "	"... 4:55 "	"... 5:05 "
"... 6:10 "	"... 6:55 "	"... 7:05 "
"... 11:50 "	"... 11:40 "	"... 11:50 "
Returning these trains leave:		
Stock Yards.	43d street.	Harrison st.
Leave... 6:50 a. m.	Leave... 6:50 a. m.	Arrive... 6:55 a. m.
"... 8:30 "	"... 8:30 "	"... 7:30 "
"... 10:35 "	"... 10:45 "	"... 9:45 "
"... 1:05 p. m.	"... 1:10 p. m.	"... 1:50 p. m.
"... 3:05 "	"... 3:15 "	"... 3:50 "
"... 5:00 "	"... 5:10 "	"... 5:45 "
"... 7:05 "	"... 7:10 "	"... 7:45 "

On Sunday trains leave Harrison street at 1:15 and 9:30 p. m., arriving at Stock Yards at 2 and 10 p. m. Returning, they leave Stock Yards at 9:30 a. m. and 6:30 p. m., arriving at Harrison street 45 minutes later.

These trains stop to take and receive passengers at Sixteenth, Twenty-second, Twenty-sixth, Twenty-ninth, Thirty-first, Thirty-third, Thirty-fifth and Thirty-ninth streets, and the fare is: between Harrison and Twenty-second, 5 cents; Harrison and crossings south of Twenty-second as far as Thirty-ninth, 10 cents; to crossings further south, 15 cents. From Twenty-sixth and points below to Stock Yards, 10 cents; and from Thirty-third and points below to Stock Yards, 5 cents.

Chicago, Danville & Vincennes.

The branch of this road to the Indiana coal fields will be ready for business about the first of January.

Chicago, Clinton & Dubuque.

An excursion train over the newly-completed Chicago, Clinton & Dubuque Railroad left Dubuque on Monday morning, via Clinton, and arrived in Chicago on Tuesday. A large number of prominent citizens of Iowa took the occasion to visit Chicago. The Chicago, Clinton & Dubuque Railroad Company has made winter running arrangements with the Chicago & Northwestern road. When the Chicago, Burlington & Quincy Company gets its bridge completed at Clinton, it is quite probable that similar arrangements will be made with the latter. The distance by this route is 195 miles.

Chicago, Burlington & Quincy.

The Chicago, Burlington & Quincy Company will remove its general offices near to the head of South Water street about the first of January. This is where they were before the fire.

Chicago & Paducah.

The work of track-laying between Bement and Monticello will begin in a few days. Mr. John E. Blunt, Chief Engineer of this road, together with other engineers connected with the roads interested, has made a survey and profile drawings for a railroad bridge across the Ohio at Paducah. It is proposed to ask Congress, this winter, to so change the act permitting the construction of the structure as to permit the bridge to be constructed on a level, with a pivot draw, similar to the Mississippi River railroad bridges. This can be constructed for at least \$100,000 less than the bridge authorized by Congress, besides being operated and maintained at a considerable less expense. The proposed bridge will have 80 piers, 72 feet in height, and will be about 4,000 feet in length. Its cost will be about \$2,000,000. The great height of the piers is necessary on account of the difference between high and low water in the river, that difference amounting to 52 feet.

Street Railroads.

The West Chicago Railway Company commenced running cars on East Van Buren street on Monday, November 25, crossing the Van Buren street bridge. The Chicago City Railway Company has a large force of men laying track on South Clark street from Clark street bridge to Twelfth street. At the bridge the road connects with the North Division cars, and when the South Division section is completed cars will run from Twelfth street to Lincoln park. The track is double, and is not an object of pleasant contemplation to many old foggy owners of real estate in the South Division. A new company has been formed to construct a street railroad on Ashland avenue, formerly Reuben street, from Archer avenue southward to Fifty-fifth street, which is the line of the boulevard to connect the south with the west parks. The southwestern portion of the city has been growing rapidly and promises soon to be a very prominent manufacturing point. The design is to connect also with the Union Stock Yards, which are fast growing in importance.

Presentation.

On Tuesday evening of last week, at the Weldon shops of the Illinois Central Railroad (foot of Fourteenth street), Mr. George Holton, for the past eight years Master Mechanic at these shops, was surrounded by a party of his friends and presented on behalf of the employees with \$800 in five-twenty bonds, and an elegant silver tobacco box. The presentation speech was neatly made by Mr. S. J. Hayes, the Superintendent of Machinery, and feelingly responded to by Mr. Holton, and a little speech was also made by Mr. E. T. Jeffery, the Assistant Superintendent of Machinery, and the affair was made pleasant in every way.

OLD AND NEW ROADS.

Canada Southern.

The track is laid from Amherstburg, Ontario, for 40 miles eastward. On the St. Clair Branch, track is laid from Moore's, opposite St. Clair, to the crossing of the Great Western Railway, and construction trains are running. Work on the shops at St. Thomas, Ontario, is progressing.

Grand Rapids & B. City.

The Detroit Tribune says: "Work is going on upon the Midland Division of the Grand Rapids & Bay City Railroad, and

the greater part of the road from Wenona to Midland is ready for the ties. The contract on the Midland end will be finished this month. Work is also being vigorously pushed near Wenona, and near that point the trains will be run into Wenona over the Jackson, Lansing & Saginaw line."

Chicago & Michigan Lake Shore.

The track is laid for 18 miles on the branch from Muskegon to Big Rapids. A very large force is at work, and it is hoped that the line will be finished this year.

Hannibal & St. Joseph.

The new line from St. Joseph, Mo., to the landing opposite Atchison, Kan., is completed and was formally opened for business November 21. The road which is 21 miles long, was commenced in August last, the contractor being Gen. J. W. Singleton, of Quincy, Ill. The stations on the new line are Winthrop, Rushville and Hall's, at each of which convenient depot buildings have been erected.

Bloomington & Washington.

A railroad is proposed to run from Bloomington, Ill., northwest to Washington, on the Toledo, Peoria & Warsaw road, 12 miles east of Peoria. The road would be about 30 miles long.

Portsmouth & Dover.

Ground was broken for this road November 25, at Dover, N. H. Hon. John P. Hale raised the first sod. The length of the proposed road, connecting directly with the cities of Dover and Portsmouth, will be 10 7/10 miles; whole amount of curvature, 5.34; length of straight line, 7 22/100 miles; total rise from Portsmouth to Dover, 106.6 feet; total rise from Dover to Portsmouth, 46.7 feet; maximum grade, 45 feet per mile; length of maximum grade, 2,000 feet. The estimated cost of superstructure is less than \$10,500 a mile. The scenery on the route is represented as exceedingly charming and picturesque, sure to be regarded with special favor by the traveling public, especially in the summer season.

The contracts for the completion of the road were awarded to George H. Pierce & Co. of Dover, the work to be finished on or before August 15, of next year. The contract for building the bridge across the Piscataqua River at Dover Point was awarded to Ross & Lord of Ipswich, the work to be finished on or before August 1, of the next year. As has been previously stated, the road has been leased for fifty years by the Eastern Railroad corporation.

Dummies in New York.

The Committee on Railroads of the Board of Assistant Aldermen of New York has reported in favor of authorizing the Mayor to license the use of steam engines on the street railroads of the city for the space of three months. A meeting of the Committee on the subject was announced publicly, and no one appeared to object to this course.

Boston, Barre & Gardner.

The contract for the extension to Winchendon has been awarded to B. N. Farren for \$25,000 per mile.

New Bedford & Taunton.

The time fixed for the transfer of this railroad to the Boston, Clinton & Fitchburg is April 1. Some legislation is needed before the transfer can be effected.

Worcester & Nashua.

The annual report of the directors shows the gross receipts of the road for the past year (ending September 30) to have been \$587,358, while \$391,905 were required for operating the road. The net increase for the past year is \$195,902, and the company begin the new year with a total surplus of \$186,274. The percentage of net income to capital and debts is a little more than 1 1/2 per cent for the year.

Louisville, New Albany & Chicago.

A final hearing of the case of Charles E. Bill, trustee, against this company, was had in the United States Circuit Court, at Indianapolis, on the 21st of November, and a decree for the sale of the road was ordered.

Long Island.

A map of the route of this company's proposed branch from Farmingdale to Babylon, L. I., has been filed in Suffolk County.

Central Vermont.

The bill for the incorporation of this company (into which the Vermont Central and the Vermont & Canada are to be merged) has passed the Senate of the Vermont Legislature by a vote of 27 to 1. We published the bill a few weeks ago.

Green Bay & Lake Pepin.

The track has reached Grand Rapids, Wis., 15 miles beyond Plover, the late terminus. The bridge over the Wisconsin River at Grand Rapids is nearly completed.

Toledo, Peoria & Warsaw.

A telegram from Peoria says that the report that this road has been leased to the Pennsylvania Company is untrue.

Vice-President Cruger has been east to arrange for the purchase of five hundred additional freight cars, which are demanded by the increasing business of the road, and will be contracted for at once. Twenty-five additional coal cars have just been purchased for the road, making 193 in all.

Northwestern Union.

Track-laying has been commenced at Fond du Lac, Wis., the track-layers working southward. In Milwaukee, the new freight depot is all roofed and work on it is progressing rapidly. The foundation for the passenger depot is nearly ready for the superstructure. Track is being laid from the depot to a connection with the Milwaukee Lake Shore & Western road at the city limits.

Alexandria & Fredericksburg.

The annual meeting of this company was held in Alexandria, Va., November 12. The annual report states that the receipts of the road have been comparatively very small, so light as to be insufficient to pay the interest on the bonds of the company, the limited receipts being attributed to a failure to make satisfactory arrangements with the Richmond, Fredericksburg & Potomac Railroad Company for the transportation of passengers and freight, whereby additional inducements could be held out for trade and travel.

New Orleans, Mobile & Texas.

Ex-Governor Sprague, of Rhode Island, has accepted the position of President of this company, which was recently offered to him. The board of directors has approved the contract recently made with Mr. Bushnell and associates for the construction of the Texas line, with the condition that the contractors begin work at once. The board has also approved the contract with Mr. Ward, of Detroit, to build the line from Vermilionville to Shreveport. Mr. Ward, for himself and associates, requires that a new charter be obtained for the Shreveport Branch, and every effort is to be made to obtain this as early as possible in the coming session of the Louisiana Legislature.

Mississippi & Tennessee.

A telegram from Memphis, dated November 21, says: "Contrary to general expectation, the old board of directors and officers of the Mississippi & Tennessee Railroad were re-elected yesterday. The road having virtually passed into the hands of H. S. McComb, it was believed all the old officers would be replaced; and their election by McComb's attorney, General Waltham, casting the stock held by McComb for the

old board, is regarded as significant of further railroad combinations. McComb obtained the preponderance of the stock over the present management after considerable hostility had been engendered."

Arkansas Valley & Cimarron.

This company, recently organized in New Mexico, proposes to build an extension of the Atchison, Topeka & Santa Fe Railroad, from the Kansas State line to Cimarron, New Mexico. The incorporators of the company are J. T. Burr, Vice President of the Atchison, Topeka & Santa Fe Railroad; John Collinson, principal stockholder in the Maxwell Land Grant and Railway Company; T. J. Peter, director and General Manager of the Atchison, Topeka & Santa Fe Railroad; Jerome B. Chaffee, S. B. Elkins, T. Nickerson, director of the Atchison, Topeka & Santa Fe Railroad, and W. B. Morley, Vice-President of the Maxwell Land Grant & Railway Company. The gentlemen also form the first board of directors.

Union Pacific.

This company is prepared to verify in Boston the income bonds of the company. Such bonds are a good delivery only when the following is endorsed thereon: "This is a valid bond of the Union Pacific Railroad Company" to be signed by the Treasurer and one of the following persons: Oliver Ames, J. M. S. Williams, John R. Duff, B. E. Bates, F. Gordon Dexter, with the date of said signatures.

The Committee on Securities of the New York Stock Exchange has made the following decision in regard to deliveries of forged bonds, in the case of the forged income bonds of this company recently received by certain dealers: "Sellers who have delivered counterfeit bonds must take them back and give genuine bonds for them, without regard to the time elapsed. They may, however, require sworn evidence that the bonds returned are the identical bonds delivered."

A telegram from Omaha, dated November 22, says that the late storm caused no detention to trains on this railroad, and that it is expected that the improvements during the past summer in raising the track, enlarging the cuts and the erection of snow sheds and snow fences will serve as an ample protection against a snow blockade this winter.

West Wisconsin.

The tunnel on the new line from Orange to Elroy, on the Madison Extension of the Chicago & Northwestern road is nearly ready for the track. The road from Warren's Mill to the Milwaukee & St. Paul crossing is all graded and tied, and the grading is nearly completed from that point to the tunnel. Track-laying will be commenced very soon.

Northern Pacific.

It is reported that the Secretary of the Interior has modified his instructions to the Commissioners appointed to examine this railroad, so that they may make their report without further delay for maps and specifications. The Commissioners are to meet very soon in Washington, and it is expected that their report will entitle the company to a portion of its land grant at once.

It is said that at the next session of Congress the company will probably ask for legislation which will enable it to modify the location of the western part of its line.

Lake Erie & Louisville.

The extension of this road from Findlay southwestward to Lima, Ohio, was completed to Lima, Ohio, 30 miles from Findlay and 10 miles from the recent terminus at Beaver Dam, on the 21st instant. The track makes a junction with that of the Dayton & Michigan, and trains are to pass on the latter through Lima. An excursion from Fremont to Lima, in celebration of the completion of the road, was to take place on the 20th. The road-bed is ready and the ties being distributed from Lima southwest to St. Mary's, 20 miles, and the track is to be laid immediately, and as soon as possible to Union City, Ind., 35 miles further. This road is to be a feeder of the Lake Shore & Michigan Southern.

Erie.

The round-house and repair shop at Corning, N. Y., were destroyed by fire on the night of November 19. Three locomotives were in the round-house, one of which was destroyed, the others escaping with only slight damage. Three coal cars were also burned. The shops were not very extensive, and the loss is not believed to be large.

Shenandoah Valley.

The Second Division of the road, through the counties of Warren and Page, in Virginia, is to be placed under construction. The line through Warren County was graded nearly two years ago, leaving only about 15 miles of grading to be done to reach Luray.

New York Rapid Transit.

There was to be a meeting of the incorporators at No. 25 West Fourth street, New York, at noon on the 29th, for the election of directors.

Denver, Georgetown & Utah.

Arapahoe County, Col., the county in which Denver is situated, has voted to issue \$200,000 in bonds to this company.

San Diego & San Bernardino.

A formal commencement of construction on this road was made at San Diego, Cal., November 11. The distance from San Diego north to San Bernardino is about 90 miles.

South Branch.

A connection has been made between the tracks of this road and the Flemington Railroad, in Flemington, N. J. Both roads have been running to Flemington for a number of years, but the connection between the tracks has never been made. It is now done in order to haul stone from the Prallsville quarries to Bound Brook, for the use of the contractors on the new road from Easton to Perth Amboy.

Williamstown.

The formal opening of this road was to have taken place November 27. The road extends from Ato, N. J., on the Camden & Atlantic Railroad, east by way of Williamstown to Glassboro, on the West Jersey road, a distance of about 15 miles. It is intended to extend the road from Glassboro to Pennsgrove, on the Delaware River. At Ato, connection is also made with the Ato Spur of the New Jersey Southern Railroad.

Baltimore & Towson Narrow Gauge.

This is the name of a company which proposes to build a railroad of three-foot gauge from Baltimore north to Towson-town, a distance of about eight miles. The road is intended for suburban traffic and is to be operated by dummy engines. Messrs. Crowley, Dickinson & Co., of Baltimore, have the contract for constructing the road, which is to be completed by June 1, 1874.

Northern Pacific-Pacific Division.

The contracts for the extension for 40 miles from Tenino, the present terminus, are to be let shortly. Of the route of the extension, the Olympia (W. T.) Tribune says:

"The line of the road extends from Hodgden's (Tenino) to Yelm Prairie, from there to the vicinity of the claim of a man named Temple, a mile and a half from the Payallup River, half way down the descent to the valley—leaving Olympia and Nisqually sixteen miles, Steilacoom and Tacoma ten or twelve miles, and indicating a terminus far down the Sound. Twenty-

five miles of the forty are over gravelly plains, requiring little else than putting down the ties and laying iron."

Dutchess & Columbia.

A meeting of the stockholders of this company is to be held at the office of the company at Millbrook, Dutchess County, N. Y., December 16 next, for the purpose of voting upon an agreement for the consolidation of this company with the Putnam & Dutchess and the New York & Boston Railroad Companies.

New Jersey Southern.

Since the completion of this road to Delaware Bay, at Bayside, N. J., a considerable trade has sprung up in oysters from Maurice Cove. About 100,000 oysters daily are carried over the road from Bayside to New York.

Railroad Aid in Ohio.

An exchange says that the towns and counties of Ohio have made issue of bonds under what is known as the Boessel Railroad Law, amounting in the aggregate to over \$2,000,000. The heaviest issues have been Scioto County, \$300,000; city of Columbus, \$200,000; Marietta, \$150,000; city of Zanesville, \$100,000; Norwalk, \$110,000. In nearly every case the bonds have long periods to run, averaging from ten to twenty years, at eight per cent. interest. The following is a list of the roads to aid in the construction of which bonds have been issued:

Blue Rock Railroad	\$20,000
Columbus & Maysville	16,800
Columbus & Ferris	250,000
Ferris & Center Bend	210,000
Gallipolis, McArthur & Columbus	25,000
Columbus & Toledo	145,000
Lake Erie & Louisville	133,150
Lake Erie, Evansville & southwestern	60,000
Lake Erie & St. Louis	162,500
New London Railroad	50,000
Norwalk Railroad	110,000
Dayton, Piquet & Toledo	100,000
Dayton & Southampton	111,000
Eastern Ohio	133,150
Marietta & Pittsburgh	80,000
Muskingum Valley	74,000
Ohio Valley & Muskingum Valley	150,000
Toledo, Delphos & Indianapolis	42,500
Zanesville, Cumberland & Caldwell	135,000

Minnesota & St. Louis.

This company has executed a mortgage for \$2,400,000 on its proposed road to the Farmers' Loan & Trust Company, of New York. The proposed line extends from the junction with the Sioux City road on the Minnesota River, southward through Scott, Le Sueur, Rice, Waseca and Freeborn counties to the Iowa State line. The length of the proposed road will be about 95 miles.

Utah Central.

A new locomotive, weighing 31 tons, with 16x24-inch cylinders, has just been received from the Hinkley & Williams Works. This makes six locomotives now on the road.

Utah Northern.

It is expected that the road will be completed to Logan, Utah, by the end of December. A large force of men is at work on the line.

Portland, Dalles & Salt Lake.

Over 100 miles of this road has been located from the Columbia River to La Grange, 50 miles of which is ready for contract, and it is expected that work will begin in the spring. An effort is to be made to obtain further aid from Congress this winter.

St. Louis Bridge.

The city engineer of St. Louis has ordered the work on the tunnel which forms part of the approaches to the bridge in St. Louis to be stopped. This action is taken because the Bridge Company has not yet filed its bond in \$200,000, to secure the city against any damage which might be caused by the construction of the tunnel, as required by the ordinance of the City Council. The bond will doubtless be filed at once and there will be no serious delay.

Indiana & Illinois Central.

Manners & Co., the contractors, have completed nearly all the earthwork of the Illinois Division, from Montezuma, Ind., westward to Decatur, and with the exception of some rock cutting at Montezuma and the trestle work at the Sangamon River, the road-bed is ready, or nearly so, for the iron, all of which is either on hand or on the way. Thirty miles of this division, it must be remembered, across Douglas County, was completed last summer. The whole division, 85 miles, unless we have unusually severe weather, will be ready for operation by the middle of January, at which time also the equipment will be on hand. The motive power is from the Grant Locomotive Works, and the cars, including passenger cars of the finest style, from Barney, Smith & Co., of Dayton, Ohio.

The company intends to construct the Indiana Division as soon as the municipalities on the line make good their donations. Before this is done, however, it will have connection with the Brazil coal field, and with eastern outlets.

Missouri, Iowa & Nebraska.

Track-laying has commenced between Griffin, Mo., the junction with the St. Louis, Kansas City & Northern road, and Centerville, Iowa, and it is expected that the road will be completed to Centerville, 20 miles from Griffin, by December 10.

Marais des Cygnes Valley.

Engineers are now making the preliminary surveys for this proposed Kansas road.

Wilmington & Weldon.

At a special meeting of the stockholders of this company, held at Wilmington, N. C., November 20, it was resolved that the franchises and property of the company be leased to the Wilmington, Columbia & Augusta Railroad Company for a term of 99 years, renewable forever upon such terms as will provide for the payment of the regular interest on all the bonded debt of that company and the assumption of all its assets, including stock and interest in the Wilmington Railway Bridge Company, and the payment of all its liabilities other than its funded debt, and the payment to this company of five per cent. on its capital stock for the current year, and the further payment of six per cent. on its capital stock for the next year, and seven per cent. for each succeeding year during the continuance of the lease; said payments to be free of United States tax. The stockholders of the Wilmington, Columbia & Augusta Railroad Company, at a meeting held the same day, also ratified the agreement, and the lease will be executed at once. The road thus leased extends from Wilmington, N. C., north to Weldon, 162 miles, with a branch from Rocky Mount to Tarboro, 19 miles, making in all 181 miles of railroad.

Richmond, Fredericksburg & Potomac.

The fortieth annual meeting of the stockholders of this company was held at Richmond, Va., November 20. The annual reports show that the receipts for the last fiscal year were: From transportation, \$335,981.01; rents, \$6,143.28; investments, \$9,795; total, \$351,919.29. The income for the previous year was \$326,180.01, showing an increase last year of \$25,739.28, or 7 7/8 per cent. The expenses last year were \$205,999.49, leaving the net earnings \$145,919.80. The increase in earnings is said to be chiefly due to increased passenger business between Washington and Richmond. The road was opened to Quantico

May 1, and since then connection has been made with the boats for Washington at that point instead of at Aquia Creek, thereby shortening the steamboat travel. Since the opening of the Baltimore & Potomac and Alexandria & Fredericksburg roads, one train daily has been run by that route to Washington, the other train still continuing to connect with the boats. The completion of the Baltimore & Potomac road, through the tunnel into the city of Baltimore, will, it is believed, bring a large increase of freight business to the line. The condition of the road is improving.

Cincinnati Coal Supply.

The Committee on Railroads of the Common Council of Cincinnati have recommended that the city contract for 1,000,000 bushels of coal to be delivered by railroad only, 75,000 bushels to be delivered every ten days.

Antioch & Visalia.

The California Narrow-Gauge Railroad Company has offered to construct this proposed road in two years, provided the right of way from the Central Pacific road at Banta's south to Visalia is secured, and 1,000,000 subscribed to the stock.

Chicago, Danville & Vincennes.

The shops of this company at Danville, Ill., are rapidly approaching completion. The car shops are inclosed, the roof is now being put on the machine shop, and the brick work of the round-house is nearly completed. New passenger and local freight depots have been commenced in Danville.

Lake Superior & Mississippi.

Many complaints are made that the officers of this road have refused to carry wood from points on the line of the road to St. Paul, which city is at present suffering from scarcity of fuel. The same complaint is made against other railroad lines running into the city.

Canadian Pacific.

Mr. Frank Moberly, formerly an engineer on the Union and Northern Pacific roads, and now on the Canada Pacific, has started to make a survey of a branch line from Thunder Bay (on the northwest coast of Lake Superior) about 150 miles northwest of Marquette) northwest to the main line.

Memphis & Little Rock.

W. B. Greenlaw obtained judgment in the Federal Court of Little Rock, Ark., on the 19th of November, against the Memphis & Little Rock Railroad Company for about \$150,000, being for work done on the road.

Cairo & Vincennes.

Mr. H. L. Morrill, the Superintendent, reports that this road will be completed and trains running through between Vincennes and Cairo by the 10th of December.

Milwaukee & St. Paul.

On the 21st this company announced to the New York Stock Exchange that an additional issue of common stock to the amount of \$1,570,000 would be made at the end of 30 days, to apply on new extensions. This is an addition of more than one-eighth to the common stock, making the whole amount of common \$13,393,496, and of all capital stock \$24,249,215. The new extensions are that from Milwaukee to Chicago, about 90 miles, and from Winona to LaCrosse, 30 miles. These are both important, and indeed, almost necessary to the company in its present condition. But the most recent acquisitions, and those for which this issue is intended, are the Sabula, Ackley & Dakota, from Sabula westward to Marion, Iowa, 85 miles, and the Hastings & Dakota, from Hastings westward 72 miles. For these, equipped as they are, the Milwaukee & St. Paul pays \$18,000 per mile in first mortgage bonds and \$10,000 in common stock.

Louisville, Cincinnati & Lexington.

On the 1st of November a mortgage was made by this company for \$725,000, to secure the payment of bonds to that amount issued for the purpose of constructing what is known as the "Shelby Cut-off," 20 miles long, which will shorten the distance between Louisville & Lexington by 14 miles.

United States Rolling Stock Company.

The London Times says: "The issue has been announced of the remaining 25,000 shares of \$20 each of the United States Rolling Stock Company, which was incorporated in the United States in October, 1871, for the purpose of acquiring and constructing locomotives, passenger carriages, petroleum tanks, and every other description of railroad equipment and rolling stock for sale or lease. On the 30th of June last a dividend at the rate of 6 per cent. per annum was declared on the capital then paid up, and the rentals received during the current half-year will enable the directors to declare a dividend of from 5 to 6 per cent. for the six months ending December 31, being at the rate of 10 to 12 per cent. per annum."

Central of New Jersey.

The Finance Committee gave notice that of the \$3,000,000 of 7 per cent. convertible bonds of that company offered September 12 last, only \$1,885,000 have been disposed of, and that the stockholders now have the privilege, irrespective of the amount of their holdings, of taking the remaining \$1,115,000 at par, paying also the interest from November 1. This offer remains open until November 30.

St. Louis & Southeastern.

As soon as the transfer over the Ohio, between Evansville & Henderson, is ready, and the "car hoist," by which car bodies arriving at Evansville on 4 ft. 8 in. trucks will be transferred at Henderson to 5 ft. trucks, is in working order, which will be early in December, it is intended to run Pullman sleeping cars through from St. Louis to Nashville and other Southern cities as well as freight cars, thus giving this short line the additional and most important advantage of a through line, which ought to secure for it a very large proportion of the growing business between St. Louis and the Southeast, which within a few years past has made the St. Louis & Iron Mountain road so prosperous.

New York & Harlem.

The Board of Engineers of the "Fourth Avenue Improvement" will receive proposals for the work between Forty-ninth and Seventy-ninth streets until 2 p. m. of December 16. Plans, specifications and blank proposals are now on exhibition at their office in the Grand Central Depot.

Burlington, Cedar Rapids & Minnesota.

The track on the Milwaukee Division is laid from Postville to West Union, and will be pushed to the crossing of the Davenport & St. Paul as fast as the weather will admit.

Whitestone & Westchester.

Proposals for wooden bridges on the line of this road were received until the 27th inst. at the office of the company, No. 11 Mercer street, New York.

American Railroad Bonds in Europe.

In a recent money article the London Times said: "The recent absence of gold arrivals from New York is not to be attributed solely to the movement of the cotton and grain crops. For many months past the Frankfurt and other German bourses, owing to the numerous defaults experienced, have been virtually closed to the class of American railway mortgage bonds with which for years previously they had been deluged. Many of the companies who had relied upon a con-

tinued sale of these securities have consequently been driven to another expedient. They have applied to large houses in New York for advances. These houses have said: 'We cannot give you cash, but we will let you have bills on our houses in Europe for the required amount.' The companies have sold these bills on the market, and they have served as remittances hither when gold must otherwise have been sent. When repayment of the advance falls due, a renewal is applied for, and if this be refused, an application is made to some other house to take over the transaction. The rise in the rate of discount on this side of course makes the system difficult and onerous, but had it not been for the wholesome check this imparted it would probably have been carried to a point of considerable danger."

Davenport & St. Paul.

Track-laying is being pushed as fast as the supply of iron will admit. The iron is purchased, and is in Chicago, for the completion of the track to Fayette, which point will be reached about Christmas. The grading from Fayette to Cresco is about one-half completed and will be pushed as vigorously as the weather will admit. Track-laying north of Fayette will be resumed upon the completion of two heavy rock cuts at Fayette—probably in April. The line is located about 15 miles north of the State line and will be located to Rochester, Minn., at once. The track was laid to Yankee Settlement, on the south line of Clayton County, 13 miles north of Delaware Center last week.

Paris & Decatur.

November 15 the grading and bridging were completed to the junction with the Illinois Central at the Sangamon River a few miles south of Decatur, and the track was to be laid to that point by this time. Thence the track of the Illinois Central will be used to Decatur. An officer of the company writes to us: "We are now running two passenger trains daily from Covington to Terre Haute, with full coaches, owing no doubt to our low rate of fare, three cents per mile. We have more freight than we can get cars to move. In 30 days we took from Arcola alone 220,000 bushels of corn."

Classifications by the Illinois Commissioners.

The Illinois Railroad Commissioners have classified the following railroads, and under the act of 1871 they are allowed to charge the following rates for passengers:

Chicago, Burlington & Quincy—Gross earnings per mile, \$9,978.55. Class B; rate per mile three cents.
Chicago & Rock River—Gross earnings per mile, \$722.22. Class D; rate per mile five and one-half cents.
Hannibal & Naples—Gross earnings per mile, \$1,905.66. Class D; five and one-half cents per mile.
Illinois & St. Louis—Gross earnings per mile, \$5,090.28. Class C; four cents per mile.
Indianapolis & St. Louis—Gross earnings per mile, \$7,681.34. Class C; four cents per mile.
Lake Shore & Michigan Southern—Gross earnings per mile, \$16,000. Class A; two and one-half cents per mile.
Pekin, Lincoln & Decatur—Gross earnings per mile, \$1,061.25. Class D; five and one-half cents per mile.
St. Louis, Alton & Terre Haute—Gross earnings per mile, 1,925.62. Class D; five and one-half cents per mile.
Toledo, Peoria & Warsaw—Gross earnings per mile, \$5,160.85. Class C; four cents per mile.

Freehold & Jamesburg.

Some of the officers of the Pennsylvania Railroad Company have been recently inspecting this road preparatory to its being leased by that company. The road extends from Monmouth Junction, on the New York Division of the Pennsylvania Railroad, southeastward by way of Jamesburg to Freehold, a distance of 17 miles, with an extension of eight miles from Freehold to Farmingdale, on the New Jersey Southern road, which was built by the Squankum Marl Company, but leased and operated by the Freehold & Jamesburg Company. The section from Monmouth Junction to Jamesburg, six miles, which forms a loop or cross-cut from the Camden & Amboy line to the line from Trenton to New Brunswick, was leased and operated by the Camden & Amboy Company, and was included in the Pennsylvania lease. The balance of the road, 19 miles, though always worked as a branch of the Camden & Amboy road, was not included in that lease, and is the line now proposed to be leased.

Philadelphia, Westchester & Downingtown.

Work on the grading between Philadelphia and Westchester is progressing rapidly. Several cuttings near Newtown Square and Sugartown are completed, and a large force is at work between Sugartown and Westchester. The line from Westchester to Downingtown is all surveyed, a very satisfactory route having been found.

International.

Two new stations were opened on this road, November 22, named Reynolds and Troupe. The latter is 140 miles east of Hearne, Texas, 18 miles south of Tyler, and only 35 miles from Longview, the present terminus of the Texas & Pacific Railway. This is 22 miles beyond Jacksonville, the last point noted.

Juniata & State Line.

In addition to the line already noted, from the Delaware River above Philadelphia to the Maryland State line at Octorara Creek in Lancaster County, Pa., this company proposes to construct a double-track line of three-foot gauge westward from the original line through the counties of York, Adams, Franklin, Fulton and Huntingdon to the Maryland State line in Franklin County. This line, which with numerous projected branches will be about 150 miles long, is intended to reach the Broad Top coal region and furnish a new outlet to the coal and iron of that section.

Boston & Providence.

The annual meeting of the stockholders of this company was held in Boston, November 21. The annual report states that the earnings for the last fiscal year, ending September 30, were \$1,716,399.42, against \$1,413,876.26 the previous year, showing an increase of \$302,523.16, or 21 1/2 per cent. The total expenditures for the year were \$1,251,052.59, or 72 1/2 per cent. of the gross earnings, leaving the net earnings \$465,346.83 against \$430,461.19 the previous year, the increase in net earnings being \$34,885.64, or 8 1/4 per cent. The road transported during the year 540,266 more passengers and 203,168 tons more of freight than in the previous year, and the increase in train mileage was 115,117 miles. New depot buildings have been erected at Pawtucket, Dodgeville, Boylston Station, Hyde Park and Heath street, Boston. Others are in process of construction at the corner of Camden street in Boston, at Forest Hills, and at Attleboro. By the close of 1873, every depot building on the road will have been rebuilt. Four locomotives, 11 passenger cars and 105 freight cars have been added to the equipment. The third track has been completed. The action of the directors in purchasing a majority of the stock of the Stoughton Branch Company was approved by a vote of the stockholders.

Central of New Jersey.

Work on the second track of the Lehigh & Susquehanna Division will continue through the winter, and will be completed from Easton to Allentown, 16 miles, early in the summer. The second track is to be laid over the whole length of the road to Green Ridge.

Atlantic & Great Western.

The office of the Treasurer has been removed from New York to Meadville, Pa., where most of the general offices are located.